ume XIV
Number 5.

MAY, 1898.

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Page 56.
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Apr. 11. 98.

TEXTILE WORLD.

MAY 14 1898
Periodical Dept.

With which is Incorporated the

INDUSTRIAL RECORD

The Textile World's Complete Directory of the Mill Trade and of Large Buyers of Textile Fabrics, for 1898, is now in preparation. It will be issued the latter part of this month, and will be presented to every paid-in-advance subscriber. It will be completely revised up to date, and contain about 400 pages, and 19 textile maps; several new features will be added.

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GUILD & LORD, Publishers, 620 Atlantic Avenue, Boston, Mass.

THE SPENCER AUTOMATIC WOOL OILER SAVES OIL, LABOR and WASTE. Geo. S. Harwood & Son, SOLE SELLING AGENTS, 88 State St., Boston.

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Bleaching, Dyeing, Drying and Finishing Machinery.

Cotton, Paper and Husk Rolls.

TENTERING MACHINES

With Patent Self-Feeding Clips.

Patent Combination Rolls

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Calenders, Mangles, Drying Machines, Tentering Machines, Hydraulic Presses, Etc.

—BEETLES—

Short and Long Chain Dyeing, Sizing and Drying Machines.

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SINGEING MACHINES.

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COMPANY,

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BLEACHING, PRINTING, DYEING,
DRYING and FINISHING MACHINERY.

TENTERING MACHINES

PATENT AUTOMATIC CLAMP,
SPRING CLAMP and PIN CHAIN.

Calenders, Mangles, Drying Machines, Continuous Steaming Machines (Patented), Calender Rolls of Paper, Cotton, Patent Combination and Husk. Singeing Machines, using Coal, Gas and Oil Fuel.

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Tentering Machines with Adjustable Cam (Patent applied for) giving a uniformly smooth vibrating motion and producing a superior finish.

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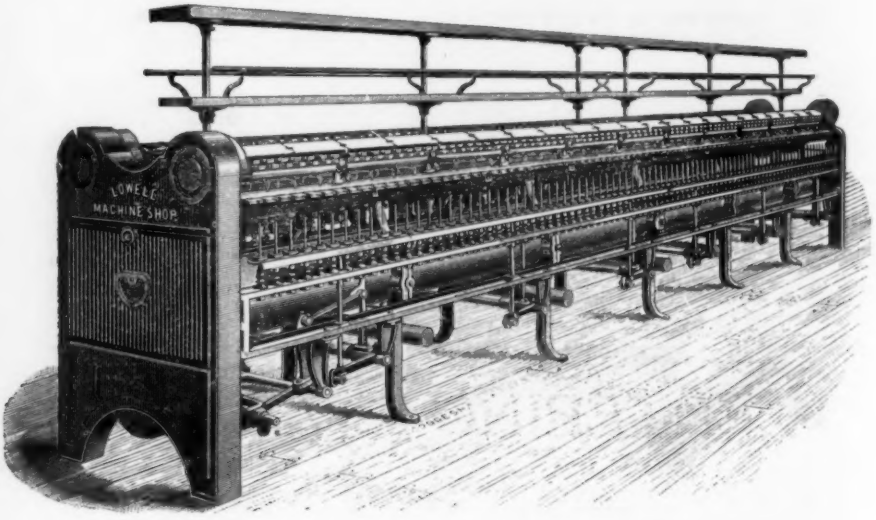

All parts are made on special tools to standard sizes and are interchangeable.

The greatest care is taken to have the frames constructed so as to obtain the greatest production with the highest speed.

All spindles are run in their bearings before being sent out.

Fluted Rolls are ground to accuracy as to their roundness and diameter, a very important characteristic for high speed.

We supply the best Separator in the market and provide all our frames with traveller clearers, lifting thread board device, cut gearing, improved roving traverse motion, heavy tin drums that don't break down, and all other parts that go with a first-class machine.

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Consideration

OF THE

Northrop . . Loom

Involves comparison with former similar innovations.

It is more expensive — yes, and so is the plain power loom more costly than the hand loom which it displaced.

Why not return to hand looms and get a cheap equipment also giving more laborers employment? The conservative should be more consistent.

Why do mills that have adopted our High Speed Spindles hesitate about using this loom? It will save them more than the entire cost of the spinning on which our spindles only gained a fraction.

If Revolving Flat Cards can be introduced in spite of their greater cost, our looms should follow or preceed them. We can show more profit to the user than the entire cost of Carding, including Drawing and Roving Machinery, with the Picker Room thrown in.

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Revolving Flat Carding Engines,
Long Chain Quilling Machines,
Wet and Dry Twisters,
Looms,

Railway Heads,
Drawing Frames,
Reels,
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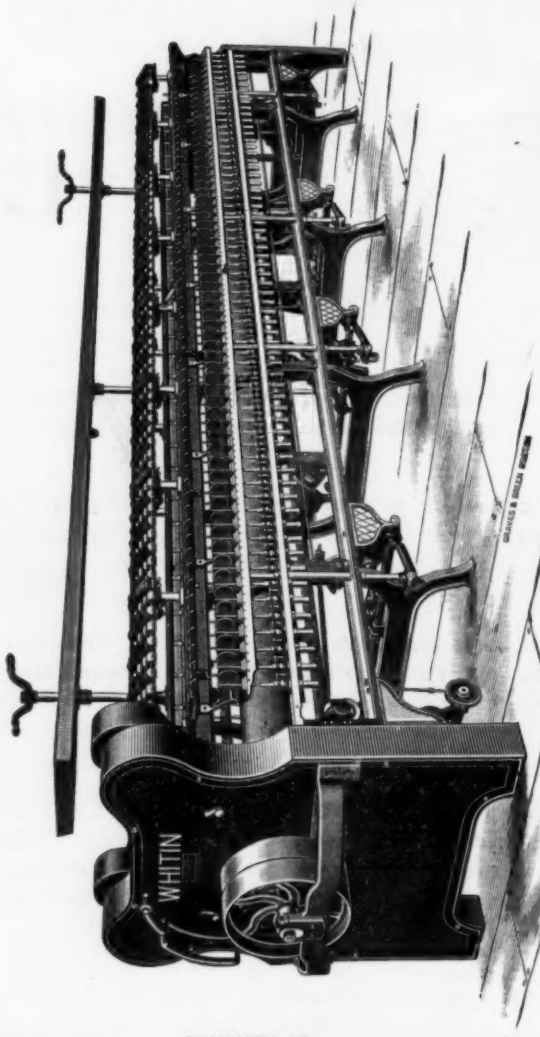

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BUILDERS OF

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Southern Office: 38 So. Tryon St., Charlotte, N. C.

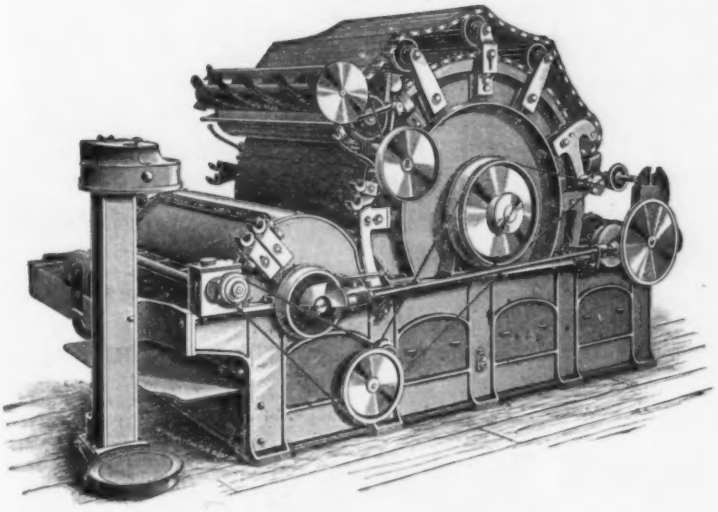
S. W. CRAMER, Southern Agent.

MASON MACHINE WORKS,

TAUNTON, MASS.

COTTON MACHINERY

NEW REVOLVING FLAT CARD.



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INCLUDING THE

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SOUTHERN AGENCY:

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HOWARD & BULLOUGH

AMERICAN MACHINE COMPANY,

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COTTON MACHINERY.

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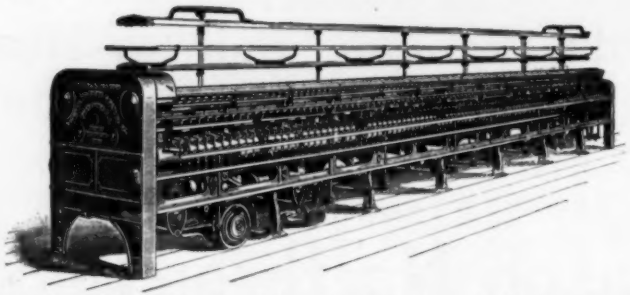
SELF-FEEDING OPENERS
BREAKER LAPPERS
INTERMEDIATE and FINISHER LAPPERS
REVOLVING FLAT CARDS
DRAWING FRAMES With Mechanical or Electric Stop-Motion.
SLUBBING FRAMES
INTERMEDIATE FRAMES
ROVING FRAMES

Improved New Pattern Spinning Frames.



This New Pattern Spinning Frame contains many valuable improvements which will certainly interest you and pay you to investigate. All parts are specially designed and so constructed as to obtain the highest speed and greatest production.

We Invite Investigation and Comparison.

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For WOOL, COTTON STOCK, YARN,
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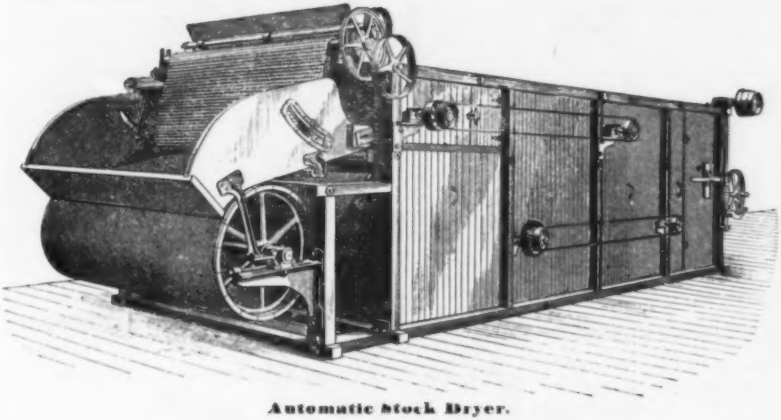

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GARNETT MACHINES,

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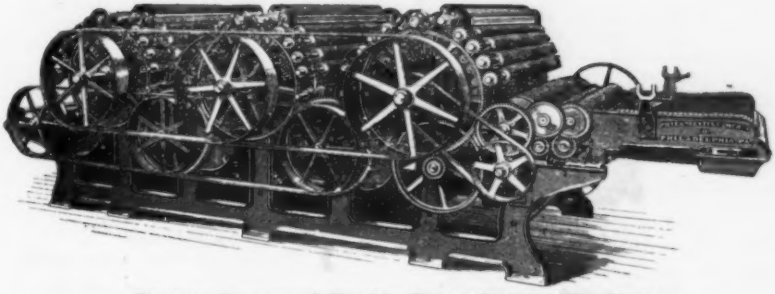
FEED ROLLS, LICKERS-IN. : : :



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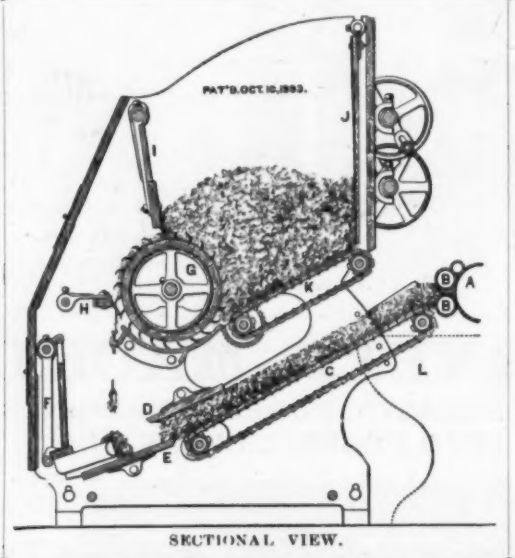
Yours truly,
WOONSOCKET WORSTED MILLS,
EDWIN FARNELL, Agent.



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(Second order.) A. GARTH, Supt.

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WORSTED MACHINERY.

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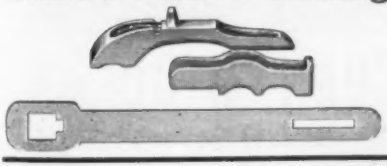

The weight can be taken off and put on to the middle rolls, without stopping your frames, when long staple cotton is used.

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No bent stirrup resting on rolls

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Also Manufacturers of Hill's Improved IXXX Tin and Galvanized Iron Roving Cans.

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Entire Outfits for New Mills, or small and odd items that you don't know just where to obtain, can be found at the

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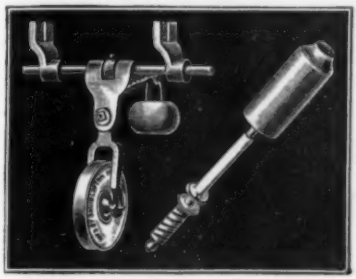

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OUR SPECIALTIES:
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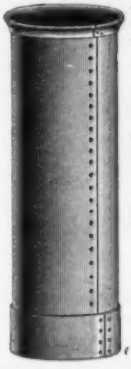

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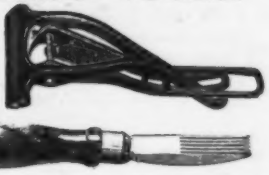

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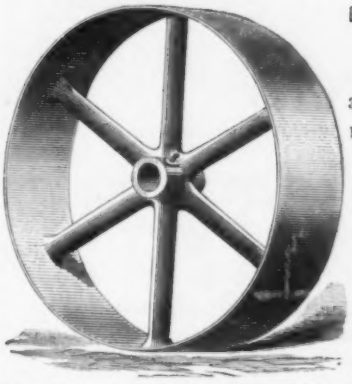

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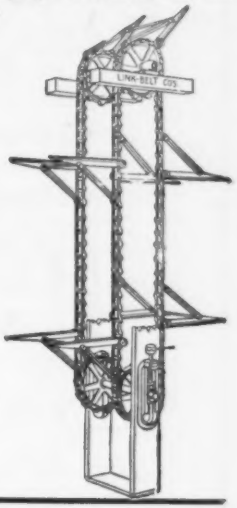
BEARINGS,
PULLEYS,
GEARING,



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PATENTS

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Telephone 3598, Boston. **Office Established 1854.** Cable address Aniline.

George W. Gregory, in November, 1874, resigned his position as Principal Examiner U. Patent Office to enter the firm.

Patents secured in the United States and all other countries, Reissues obtained. Interferences conducted. Suits brought and defended for infringement, and searches made as to the validity of patents. Prepared to give special and expert attention to cases involving knowledge of cotton, wool, leather and metal working machinery, including boots and shoes and electrical, chemical and metallurgical inventions and steam engineering Correspondence solicited. No charge for preliminary advice. Personal consultation best when possible.

HOPEDALE, Mass., January 3d, 1898.

Mr. George W. Gregory, of Crosby and Gregory, has taken out for us since January, 1875, more than two hundred patents. GEO. DRAPER & SONS.

PATENTS

Wright, Brown & Quinby,

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List of Textile Patents.

Issued March 22 and 29, and April 5 and 12, 1898.

Specifications and drawings furnished for ten cents each Address W S. Gavey, P. O. Box 222, Brooklyn, N. Y.

Baling Press, Cotton. 601,806 F. L. Dyer, Washington, D. C.

Bobbin. 602,260. H. D. Klots, Garden City, N. Y.

Bobbin. 602,240. G. Pendleton, Jr., Carbondale, Penn.

Bobbin. 602 241. G. Pendleton, Jr., Carbondale, Penn.

Bobbin, Sheet-Metal. 602,183. J. A. Sutcliffe, Blackburn, Eng. Assignor to himself and George Paley, Preston, Eng.

Cotton Opener. 602,265. J. O'Connell, Chicopee, Mass.

Cotton-Picking Machine. 602,076. A. A. Hamerschlag, and T. H. Price, New York City.

Cloth, Apparatus for Detecting Wrinkles in. 601,780. T. Rowe, Woonsocket, R. I.

Cloth-Cutting Machine. 601,608. A. & E. Levene, Philadelphia, Pa.

Carding Engine. 600,882. George Martin, Southport, Eng.

Cloth-Napping Mechanism. 600,885. C. M. Musgrove, Pittsfield, Mass.

Dye, Blue-Black Mixed Trisazo. 601,-033. M. Boniger, Basle, Switz. Assignor to Chemische Fabrik, Vormals Sandoz, same place.

Dye, Black. 601,365. H. R. Vidal, Paris, France.

Dye, Thiazin. 601,363. H. R. Vidal, Paris, France

Dyes from Sulfanilic Acid, Obtaining. 601,364. H R. Vidal, Paris, France.

Dye and Making Same, Black. 11,659. R. Vidal, Paris, France.

Dye, Blue Azo. 601,859. C. Rudolph, Offenbach-on-the Main, Germany. Assignor to the firm of K. Oehler, same place

Embroidery Holder. 601,523. J. C. Orchard, Tacoma, Wash

Knitting Machine. 601,548. J. Bradley, Cheltisford, Mass.

Holland and Colonies.

Patents. Trade Marks.

H. Massink, L. D. at Amsterdam.

Knitting Machine Cam. 601,408. W. T. Barratt, Bennington, Vt. Assignor to Chas Cooper, same place.

Knitting Machine Needle. 601,281 L. E. Salisbury, Providence, R. I. Assignor to John Millar, same place.

Knitting Machine, Straight. 601,307. L E. Salisbury, Providence, R. I. Assignor to John Millar, same place.

Knitting Machines, Tension-Take-up-Device for. 601,297. F. B Wildman, Norristown, Penn. Assignor to the McMichael & Wildman Mfg. Co. of Pennsylvania.

Knit Mitten. 601,894. I. W. Lamb, Perry, Mich. Assignor to the Lamb Glove & Mitten Co., same place.

Knitting Machine. 601,067. E Walton, Weston, Mass. Assignor of one-half to Wm McLeod, Wellesley, Mass.

Loom For Weaving Tubular Fabrics. 601,215. C. T. Stetson, late of Hanover, Mass.

Looms, Lay or Batten for. 600,996. I. Wollenberg, Paterson, N. J.

Loom Shuttle-Changing Mechanism. 601,-336. C. A. Littlefield, Lowell, Mass. Ass'gnor to the Northrop Loom Co., Saco, Me, and Hopedale, Mass.

Looms, Selvege-Weaving Device for. 602,316. J. K. Schumacher, Wermelskirchen, Germany.

Measuring Device, Cloth. 601,277. C. Pulcher, Murphysborough, Ill.

Spindle. 602,254. J. Duffy, Paterson, N. J.

Spindle Bearing. 602.110. W. M. Rushworth, and Higginbottom, Lowell, Mass.

Spindle Support. 602,171. E. H. Ryon, Waith m, Mass. Assignor of one-half to A. M. Goodale, same place.

Spinning Machine Heart Motion. 602 303. G W. Chadwick, Chester, Pa.

Wool Drying Apparatus. 601,317. J. Fielden, Rochdale, Eng.

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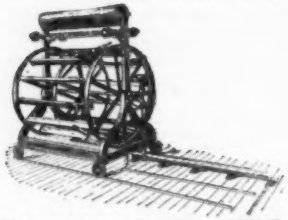

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Here are a few points:

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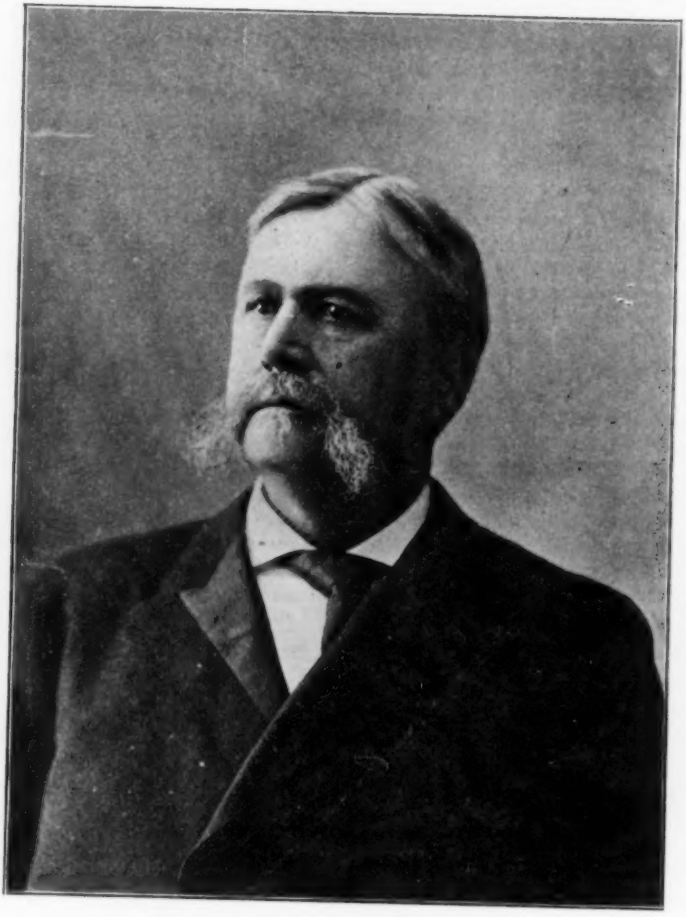

M. V. B. JEFFERSON.

TEXTILE WORLD.

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M. V. B. JEFFERSON.

The Hon. Martin V. B. Jefferson, was born in Uxbridge, May 19, 1834. His grandfather was a soldier in the Revolution, and also in the War of 1812. His father died when Martin was but eight years of age, and he was "put out to live" with an uncle in Holden, on a farm, where he received ten weeks' district schooling, and his board and clothes as compensation for his labor. At the age of sixteen, his natural independence asserted itself, and he went back to Uxbridge and learned the trade of shoemaking, by the practice of which, working mornings, evenings, and during school vacations, he earned money enough to pay his expenses at Uxbridge Academy, which he attended for four years. In 1853, he went to work on the Providence & Worcester Railroad, as brakeman and baggage master, but having an arm and leg broken by a railroad accident, he was obliged to suspend work. On his recovery, in 1854, he went to California, where he remained for six years. The first year he kept a restaurant at San Jose, the second year he sold fruit trees at Sonora, but the remainder of his stay in California was devoted to selling milk from a large ranch where he kept from eighty to one hundred cows.

Having acquired a considerable sum of money, Mr. Jefferson, in 1860, returned to Holden, where he married a daughter of Deacon William Howe, of the firm of Hall & Howe, who were then running a small, one-set woolen mill in Drydenville, now Jefferson. In November, 1860, he purchased Mr. Hall's interest in the mill, and for twenty-six years he was in partnership with his father-in-law in that business under the firm name of Howe & Jefferson. Meanwhile the little one-set mill was enlarged six-fold, and a second mill with six sets of machinery was added, making a total of thirteen sets, the two establishments employing two hundred and fifty hands. The little village has grown to eight times its former size, and now supports two railroad stations on the Fitchburg, and Central Massachusetts Railroads, and a post office. In 1886, Mr. Jefferson bought his partner's interest in the business, and now runs the mills himself, by the name of the Jefferson Manufacturing Company, making woolen goods.

About noon, December 8, 1892, the mill property caught fire from the picker house, and the lower mill, together with the picker house, a stock house, and a two-tenement dwelling were burned. The loss was nearly $150,000. Arrangements were at once made for building on the site of the burned mill, a new mill of brick, embodying the latest and best ideas on mill construction. In March, 1893, the Jefferson Manufacturing Company also purchased the real estate of the Holden Mills.

For ten years Mr. Jefferson served as selectman of Holden, a portion of the time as chairman of the board. In 1875, he removed his residence to to Worcester, for the sake of better educational advantages for his daughter. He was a director of the Boston, Barre & Gardner Railroad for several years; is a director and president of the Cotton and Woolen Manufacturers Mutural Insurance Co., and a director of the Quinsigamond National Bank of Worcester. He is a member of the license commission of the city of Worcester.

In politics, he has been a staunch

Republican, since he cast his first vote for president, in 1856. He was elected to the State House of Representatives of 1880, from the nineteenth Worcester district, by a handsome majority, and was returned in 1881. He brought to his legislative duties the same stirring qualities he has displayed in other things, and served on the important committee on the Hoosac Tunnel, Troy & Greenfield Railroad. Mr. Jefferson was elected to the State Senate from the first Worcester district, which comprised the city of Worcester, in 1884 and 1885, and served on the committees on railroads, treasury, and labor. In 1888, he was chosen an alternate delegate to the Republican National Convention from his Congressional district, and. in 1896,, as delegate to the St. Louis Republican Convention.

Mr. Jefferson's business capacity, shrewdness, and integrity have secured for him a merited success in business, and the confidence and esteem of a large circle of acquaintances. He is accustomed to congratulate himself that he has always paid one hundred cents on the dollar, a phrase which fully expresses the general estimation in which Mr. Jefferson is held socially and politically, as it does his financial and business standing.

Wool Duster Screens.

MADE BY A. J. BECKLEY & CO., GARWOOD, N. J.

As is well known in the experience of all mill men, a good article for a dust screen is an important acquisition in the economy of manufacture. Many of the devices that are now used fail in their functions, by their meshes becoming clogged with the waste, preventing the proper cleaning of the same. In order to overcome this objectionable feature, A. J. Beckley & Co., Garwood, N. J., manufacture a steel plate, of required thickness, punctured by a special process with oblong holes, having one edge of which raised so as to cut the dust and dirt as it is being agitated in the machine. An idea of this screen may be obtained from the accompanying illustration.

In order that manufacturers may have a true appreciation of this device before placing orders for it, this company is disposed to send sample screens for trial.

In connection with this it may be of interest to state that this company make a perforated plate from specially prepared copper metal, for wool washing, rinsing, and dyeing of raw stock. This prepared metal is a specialty with this concern, being the result of careful observation of the action of dyestuffs upon different kinds of metal. Wherever used in cotton and woolen mills, it has met with universal favor.

This company also make a line of perforated picker cases, drying belts, etc.; and five hundred different designs, from the fine screens to the three-eights steel plates for coal and stone. A catalogue of the products of this company will be sent upon application.

—Some of the stock of a Southern cotton mill has recently been offered in Boston at a seemingly low price, when it is considered that the mill's earnings have been credited at nearly twenty per cent. a year, for a number of years. The best offer that could be obtained for this stock was par value. This fact has raised in the minds of some, a doubt as to the methods of book-keeping in Southern mills, as being something which Northern business men would consider as rather loose.

Textile World

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COMBINING

THE AMERICAN TEXTILE, THE DESIGNER AND WEAVER, WARP AND WEFT, THE WOOLEN MANUFACTURER

AND THE

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An Illustrated Monthly Magazine representing the Textile Industries of the United States.

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Dealers in Raw Materials,
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Special quarterly issues are published in January, April, July and October; one (January) being a statistical issue, and the others devoted especially to the cotton, knitting and woolen branches, respectively.

NEW ENGLAND TEXTILE INDUSTRIES.

The present depression in the textile manufacturing industries of New England and elsewhere, has called attention to the machinery and methods employed in their operation, and also to the effect of legislation covering the hours of labor, etc. The cotton industry is at the present time in the greater distress; and the manufacturers of Massachusetts, in particular, are deeply concerned as to the future of their enterprises, affected by the unfavorable conditions surrouding them, in the employment of labor and the disadvantages arising under the laws of taxation.

The cotton manufacturing situation has been brought to national attention by the recent resolution on the part of a Massachusetts congressman, for an amendment to the Constitution of the United States, giving to congress the power of regulating the hours of labor affecting manufacturing establishments in the several States, with the well-known intention of eliminating the disparity existing between the hours of labor in Northern and Southern mills. So serious had this matter become that the Massachusetts legislature has been memoralized by a number of leading cotton manufacturers, suggesting that the State laws be either amended or repealed, whereby the laws of labor in factories can be put more on a parity with those existing in other States, and permitting exceptions favorable to the reducing of taxation of mill properties.

The machinery in the cotton mills in Massachusetts is declared in the memorial, to be, in its average condition, as good as it has ever been for economical manufacturing, and at no time have the operatives been more skillful or the quality of production superior, or the commercial and financial management abler than they are to-day. No further tariff protection is asked for, but simply amendments to our labor and taxation laws, the latter being more onerous than those existing in the Southern States, to say nothing

of those in England. The memorial suggests that the taxes on machinery be taken off, without increasing those on real estate.

This memorial to the Massachusetts legislature can have no other effect than to call attention to the distressed condition which cotton manufacturing is in to-day. There is not the least prospect of the State legislature changing its laws affecting labor or taxation. This is very evident from conversations had with the committees on taxation and labor, and other members of both branches of the legislature.

In regard to the condition of cotton machinery in our Northern mills, it must be admitted, that, generally speaking, it is in good repair, and as efficient as it ever was, and that manufacturers have been alive to the necessity of improving their machinery with the devices that have been satisfactorily proved as economical, more particularly in the line of increased production, rather than those affecting the quality of the product. It may be safely said that the spinning machinery in the cotton mills of New England is first class. Nearly all of the mills are equipped with modern spindles, and the carding department has been modified in the adoption of recent improvements as rapidly as could reasonably be effected. The recent advances made in weaving have been so radical of late that many mills have been unable to keep up with them, while the new mills of the South have been in a position to take advantage of them, which, with favorable labor laws, has enabled the latter to compete with the Northern mills greatly to their disadvantage.

It is not so much a question whether cotton machinery fifteen or twenty years of age is doing as good work as that of more recent date, as it is whether its low productive capacity justifies its being retained. Supersession on account of improvements forces upon the manufacturer the necessity of having a large depreciation account upon which to draw, in order to keep his plant properly equipped.

Perhaps at no time in the history of the cotton manufacturing industry, within the last fifty years, have devices multiplied so rapidly for reducing the cost of production, as within the last eight or ten years, noted, for instance, in the introduction of the revolving flat card, the Northrop loom, the loom that is now coming upon the market, made by the Crompton & Knowles Works, and the automatic drawing-in machine that has recently made its appearance, to say nothing of the improvements in spindles. As an example of the saving that has been effected by improved machinery within the last few years, may be instanced the comparative cost of production that was given in the valuable paper of Malcolm Campbell, that was read at the late meeting of the cotton manufacturers' association, showing what can be saved by the revamping of mills having old machinery. Mr. Campbell based his statement on the cost sheet of a mill in 1895, working with old machinery, and in 1898 working with new machinery, allowing eleven per cent. difference in the price of labor in favor of 1895. The production of the mill averaged 31.5 yarn, made from 4.25 hank roving. He showed that the actual saving in labor was 1.76 per pound, or about 20 per cent. He also gave the figures of another mill, where only fly frames were put in new. For two years the treasurer of this company, he said, questioned whether it would be a paying investment for him to throw out his old frames; but, to-day, he only wonders that he delayed the matter so long. As a result of the change, however, the card room cost was reduced from 1.2 to .94.

It should be borne in mind that all of these labor-saving devices have been taken advantage of by the new mills recently erected in the Southern States, which, in addition to the fact that the labor cost per hank is much less, say, 30 per cent., places the Northern mills at a most decided dis-

advantage, which cannot be overcome, as we can see, at once.

This applies with special force to New England mills on same number of yarn that is being made in the South. Fine yarn mills stand in a better position. We feel that in time this will adjust itself, and that New England mills will again be placed on a basis where they can favorably compete with the Southern mills. There are advantages in this locality that cannot be disregarded, such as better banking facilities, nearness to the machine shops, and the better climate for continued labor. The South has nò, or very little,, advantage in the matter of cost of raw material, or even that of fuel, except in one of two favored localities. The lower cost of building is offset by the increased cost of machinery. There is one thing, also, that should be borne in mind, and that is that many of our New England mills, as compared with recently built mills in the South, are not so economically arranged in relation of one department to the other.

The woolen mills of New England, and we might say of the whole country, are in a far less satisfactory condition concerning improved machinery, than the cotton mills. The woolen mills in this respect are very much out-of-date. It may be surprising to many of our readers to know that the 1890 census reports revealed the existence of a large number of out-of-date carding machines in the United States, not only in the middle and western sections, but right here in New England. Nearly one-tenth of the carding machines in existence in 1890, were 36 inches or less, wide, and nearly one-half of these were only twenty-four inches wide, indicating machines that were made from ten to thirty years previous to 1860. In fact, there are well-known mills in the State of Massachusetts that are making fine yarns to-day on machines that were constructed long before 1850, and in some of our best mills it is not uncommon to find machines that were built in the sixties. Even if the work done by these machines is as good as that made on those of more modern pattern, the production that they are capable of turning off must be far below the economical point, and the labor cost consequently greater than it should be.

It is our impression, if woolen manufacturers, the agents and practical men at the head of the concerns, would come together occasionally, the same as the cotton manufacturers, as represented by their association that held its annual meeting in Boston the last week in April, and discuss matters pertaining to their vocation, they could improve their conditions very materially. There is no reason why mutual confidence in this respect should not result as beneficially to the woolen, as it has to the cotton, manufacturer.

MERCERIZED COTTON.

A case is likely to come before the Board of General Appraisers, upon an appeal from a decision of the collector of customs at New York, regarding the proper classification of cotton goods that have passed through the process of mercerization. The point at issue is whether cotton goods thus subjected should be classed with those which have been bleached or colored, or not bleached or not colored. The collector claimed that the process of mercerizing, by which a silk effect is imparted, is in the nature of bleaching or coloring, and, therefore, such goods are subjected to a duty more than that imposed on those not bleached or not colored. As is well known, cotton yarn and cotton goods are divided, for tariff purposes, into two classes, as not colored, bleached or dyed, and as colored, bleached, dyed and combed, the latter carrying an increased rate of duty.

The mercerization of cotton is something that has come conspicuously into vogue within a short time, and the importation of such goods was little known or thought of at the time the present tariff act was framed. Had attention been brought to this new process, or rather to the new application of an old process that was in-

vented as long ago as 1850, no doubt some provision would have been made in the tariff act to cover just such importations. So long as mercerization received no specific recognition in the law, goods thus treated must be considered under the general terms of either bleached or colored, or unbleached or not colored. The decision of the appraisers, therefore, will have to rest upon the determination of a fact, and not a theory, whether mercerized goods are bleached or colored, or otherwise.

Our own opinion is that mercerizing in itself considered, is neither a bleaching nor coloring process. Goods that are mercerized may be bleached or colored, but this latter condition, we contend, is not due to mercerization. We should expect to find, however, that mercerized goods had been through some process for the removal of the natural impurities that are attached to the cotton fibre; in other words, that the goods had been bleached, as a desirable precedent to mercerization. That mercerization does affect the color of the fibre, is undoubtedly true, due to the fact, however, that the fibre is made more translucent, which causes the fibre to absorb the rays of light, rather than to reflect them, as is the case in purely bleached cotton. A translucent cotton fibre appears darker in shade than one that is not translucent, but this does not necessarily convey to the understanding that the fibre has been colored in the ordinary acceptation of this term.

The proper understanding of bleaching is whitening, or the removal of impurities from the cotton fibre, or everything but the cellulose, i. e., the wax, albuminous matter, coloring matter, etc., beside accidental impurities, as grease, starch, oil, etc. Cotton, to become bleached, must come in contact with water, and the whitening or the destruction of color depends on the liberation and action of oxygen in a nascent condition. It is the action of nascent oxygen on coloring matter that destroys the latter, and it is for the accomplishment of this result that all processes of bleaching are directed. Its attainment is true bleaching, in which the processes of mercerizing have little or nothing in common. There is nothing in the processes of mercerization that will produce nascent oxygen, an essential element in the bleaching of cotton. Bleaching, if properly done, should not change the character of the cellulose, while mercerizing affects and changes the nature of the cellulose, and strengthens the fibre. Bleaching, on the other hand, should it act on the fibre or cellulose, would injure its strength, and is always to be avoided.

The principles of mercerizing are the same today as they were at the time they were discovered and the process patented, in 1850. The ingredients used for mercerizing are chiefly caustic soda and sulphuric acid, though caustic potash and chloride of zinc can be used. The proper utilization of these ingredients depends upon their strength and temperature, and careful manipulation. The process can be applied to cotton goods, either bleached or unbleached.

It is only since mechanical means have been adapted to this process, by which the yarn or goods are kept at a tension to prevent shrinkage, that they have been able to be manufactured economically; and it is these stretching or tension devices that accomplish the desired object of rendering the goods glossy, having the appearance of silk.

We have communicated with quite a number of parties who are practically familiar with mercerizing, and while many of them believe that yarn or fabrics that have been thus treated should bear a higher rate of duty than ordinary unbleached goods, still, none of them regard mercerizing as a bleaching or coloring process, in itself considered.

We shall be interested in the decision that will be arrived at by the Board of General Appraisers.

THE PARIS EXPOSITION.

The government of the United States shows an apparent indifference to the part that this country should take in the Paris exposition of 1900. Nothing has been done by congress, more than to publish the report of the special commissioner, Moses P. Handy, and nothing more is likely to be done till congressmen get their minds in such a state that they are able to consider measures of this kind, instead of being wholly engrossed in those pertaining to war.

The legislature of Massachusetts, however, is taking an active interest in this exposition, and a resolution, is at present writing, so far advanced that it probably will be ready for the signature of the governor within a few days. This resolution calls for an appropriation of $20,000 for this purpose, and the appointment of eight commissioners. This is a good example for other States to follow. Massachusetts is always in the van in anything of this kind, trusting to the character of the commission that no unnecessary expenditures will be made, notwithstanding the liberality of the appropriation. Massachusetts should see to it that every facility is offered to the industries of the State, so that they shall be properly represented at Paris, and to this end act in unison with the national commission when it is appointed.

As we have stated, congress has taken no advance step in seeing that the industries of the country are properly represented, though an act was passed in July, 1897, providing for the acceptance by the government of the United States of the invitation extended by the republic of France to participate in the exposition, and in furtherance of this acceptance, Major M. P. Handy was appointed as special commissioner, who visited Paris, and reported to congress, recommending an appropriation of about one million dollars, so that a creditable exhibit might be made. About three and one-third acres of space have been allotted to the United States, 32 per cent. to be given to machinery, electricity and appliances, including steam engines, tools and implements, and the production and mechanical utilization of electricity; and 26 per cent. to manufactures, including those for the decoration and furnishing of public buildings and habitations, textile fabrics, methods of tanning, paper, cutlery, jewelry, etc.

The application for space has already exceeded the allotment, on the basis of allotting the bona fide demands to economical limitations.

The arrangement of the exhibits is to be very much on the plan that was found to work so satisfactorily at the late Brussel's exposition, of making collective exhibits of products, and thus avoid the confusion that existed at the Paris exposition of 1889 affecting the United States exhibit, in particular, resulting from treating exhibitors as if they were shop-keepers, to each of which must be assigned a separate booth. In all departments of the exposition, as far as practicable, materials and processes will be found in contact with products. The machinery will be operated under the eye of the public, so that visitors may familiarize themselves with its practical workings, and follow the successive transformations of the crude material until it assumes the form of finished work. The idea is to bring the products of a single country into juxtaposition, as well as those of different countries, pertaining to one class of industry. The convenience of this to the visitor is apparent, who may thus review successively the various exhibits of the United States, for instance, by following one direction, and by proceeding in another direction, he may examine successively all of the exhibits from the different countries, of one general class, such as manufactures, etc. Every effort will be made to eliminate from the exposition everything that can be characterized as purely commercial enterprises. Every exhibitor will have to make it clear to the authorities that he has a position

in his branch of industry which will warrant him a recognition.

The advantages to the industries of this country, of an exposition located at Paris, are immeasurable, due, if nothing more, to the fact that the products of the United States are attracting the attention of all people of the civilized world, more and more, as coming into direct competition with the manufactures of foreign nations, showing not only superiority in manufacture, but in many instances lower cost. This is becoming particularly true in everything in which iron and steel are used, and in which American ingenuity comes into play. It would almost seem unnecessary for us to enumerate any instances in this respect, but there were many such in 1897 which excited comment in the press of other nations, and especially was this true of articles made of steel, notwithstanding the higher wages that are paid to labor in their manufacture, in this country.

It is these small articles in which the industries of Massachusetts are so prominent, which should find a conspicuous place at the exposition. In nothing, however, is this State more interested than a proper exhibition of its machinery and manufactures relating to the production of shoes. The factory product of boots and shoes in this State is about 55 per cent. of the total value of such product in the United States. Not only are our boots and shoes superior in quality, but they are cheaper than those made in Europe, notwithstanding the wage earnings of the American operative are 250 per cent. greater than those of the German operative. There is a demand in foreign countries for the tanning machinery of this State, which is referred to in our consular reports as standing very high in the estimation of foreign tanners. This machinery and also our tanned leather, dressed skins, etc. should not be without proper representation. This is a large State industry, and in the manufacture of morocco leather alone, one-fourth of the product of the United States is made in Massachusetts. Our sewing machines have long had an enviable reputation abroad, and one-fifth of all the machines made in the country are made in this State.

It is not supposed that our woolens would receive much benefit from any exhibition at Paris, as there is no possible likelihood of their being exported to compete with like manufactures made abroad. This, however, does not apply to our cotton manufactures. These have a fair competing chance to sustain a profitable trade by the side of foreign products, and it would be of material advantage, we think, to our cotton manufacturers if they should take an active part in seeing that their products were well represented at Paris. It is the largest industry, next to the boot and shoe in value of product, of any in the commonwealth. At least, one-third of the value of the cotton goods made in the United States is made in Massachusetts. All things considered, we trust that the State and our manufacturers will see that Massachusetts is creditably represented at the Paris exposition in 1900.

ELEMENTS OF PROSPERITY.

Notwithstanding the present depression and lassitude in business, there exists in this country elements of undoubted prosperity, that require only favorable opportunities to evince themselves in a way that they may be appreciated. The forces of prosperity, notwithstanding, are in a state of activity, taking the country as a whole, in which our trade and commerce will be visibly benefited, sooner or later. The present martial disturbances cannot be regarded other than temporary, and when they are removed, there is no apparent reason why all enterprises should not feel the benefits arising from the favorable conditions that now exist. The chief apprehension at the present time exists more with the banking than with the mercantile occupations. There is an abundance of money in the country, notwithstanding the

fact that many loans are being placed at a comparatively high rate of interest. Gold is arriving in large quantities in settlement of the balance of trade with foreign countries, in our favor. Sixty-six million dollars in gold has come into the United States since the beginning of the movement of gold towards this country. As an evidence of the reserve financial power that exists in this country, may be noted the easy absorption of American securities that have been placed upon our markets by Continental holders, due to the necessity of the latter realizing upon them, because of the great decline in Spanish bonds, which require to be provided for. Our railroads never were doing better, notwithstanding the great cuts that have been made, in many instances, in freight rates. Railroad stocks are earning fourteen per cent. more than last year, and nearly five per cent. more than in the year of 1892. At this time, east bound railway tonnage from the Mississippi is ten per cent. greater than in 1893. The transactions at the clearing houses of the great money centres in the East are one-third more than last year at this time, and over six per cent. greater than in 1892. The wheat market is in an excellent condition, not only in demand, but in the prices obtained for the cereal. The same can be said of corn. These conditions are not speculative, but to meet real wants. Although our cotton manufacturing industry is depressed and our woolen industry also affected, silk manufacturing is enjoying a period of unusual prosperity, and the same can be said of the boot and shoe industry, which never was better than it has been this year, thus far.

TEXTILES FOR THE ARMY.

Some of our textile mills are already supplied with sufficient orders for goods for army purposes, from the government, to keep them running full time; in some instances, day and night. This demand will affect both our cotton and woolen mills. There are very few of the latter that are now manufacturing all-wool flannels, such as were made thirty years ago. This fact has an interesting connection here, due to the demand, for army purposes, for goods of this character, which have been superseded, for ordinary wear, by knitted fabrics. The result of the demand for flannels, more particularly 6/4 dark blue blouses and 3/4 blouse linings, will induce a number of our mills to change their machinery over to this class of fabrics. They will all have to be made, and this will take time, as the market is practically bare of them. It will have the advantage, however, of removing much of the pressure in other directions, which is a matter greatly to be desired. The government stands in great need for cotton material for tenting purposes, and the strictures are very rigid for a first class fabric, the standard of the government being that the goods shall stand a fire hose being played upon them for three-quarters of an hour before the water shows through. This is regarded to be an essential feature in tenting supplies for use in Cuba during the rainy season. Cotton ducks and drills will be in great demand, and advertisements are already in the papers for proposals for such goods for government use. The goods in want are eight ounce, ten ounce, and twelve ounce duck. The new tan color, fast dyed goods are especially wanted; the deliveries to commence on or after July 1st, next. Blue kersey cloth for overcoats and trousers, for the soldiers and marines, will be wanted, and rush orders have already been placed with some mills for them. These demands on the part of the government may have such an influence upon manufactures that our textile mills may find themselves well supplied with orders before they knew it.

—The dyer can afford the designer considerable assistance by the production of new shades.

KNIT GOODS COMBINATION.

Consistent with the general tendency of all business enterprises, a number of knit-goods manufacturing establishments, those engaged in the manufacture of underwear, have been considering a scheme for a combination of interests in one corporate body, purely, as we understand it, in the line of economy. Saving is expected to be made in the expenses for the purchase of stock and the selling of the manufactured product; operating through a few, instead of many, agents. It is the intention, should the scheme be caried into effect, to have one central selling office, one cotton buyer, one wool buyer, and one trimming buyer. Its further object is to eliminate the unprofitable competition that is unavoidable when many mills are seeking for the same trade. What affect the death of W. H. Rowe, upon whose conception the combination was suggested, will have, it is impossible to say, at this time. It will probably have the effect of delaying matters, at least.

We are informed by one of the parties mostly interested, that 162 sets of machinery and 1026 knitting cylinders are already committed to the combination, although from the particulars that we have received, we are unable to figure out this amount of machinery. We have the information from some among those reported to have signified their disposition to join, that they do not propose to take any part in the scheme.

According to present arrangements, the combination is to be incorporated under the laws of New Jersey, with a capital of thirty million dollars, ten millions of which are to be in six per cent. gold, 100-year bonds; five millions in five per cent. preferred stock; and fifteen millions in common stock. It is proposed to purchase the mills and their stock in process of manufacture, outright. For the former, will be given the appraised value in six per cent. gold-mortgage bonds; and, in addition, the owners will be given a bonus of fifty per cent. of the appraised value of the plant in common stock; while the stock in process of manufacture will be paid for in preferred stock. It will be seen by this arangement that there is more or less watering done in the disposition of the stock. As a matter of good management, the present owners of the mills will be allowed to retain their managing position, if they so desire.

SHEEP IN AUSTRALASIA.

There are several consular reports published by the State Department, concerning the sheep industry of Australasia, from which we deduce the following statistics, as representing some points of interest in showing not only the growth of the industry in the number of sheep, but in the average weight of the fleeces, and consequently, wool production. It will be seen upon examination of these statistics that in the 24 to 26 years under review, the average weight per fleece increased 74 per cent. in New Zealand; 113 per cent. in New South Wales; 51 per cent. in Tasmania; and 24 per cent. in Victoria. This general increase is due to the improved methods of breeding, in which density of fleece, length of staple and good supply of yolk are conspicuous factors. The occasional decline in the weight of fleece, as noted between some of the dates, was due to abnormal conditions, mostly drought.

Colonies.		No. of Sheep.	Average wt. per Fleece. Pounds.
New Zealand	1870	9,700,629	3.90
	1880	12,985,0?5	4.56
	1890	17,865,423	5.96
	1896	19,138,493	6.79
New South Wales,	1870	16,308,585	2.96
	1880	35,398,121	5.09
	1890	55,986,431	4.77
	1896	48,318,790	6.31
Tasmania	1970	1,349,775	3.18
	1880	1,783,611	5.
	1890	1,619,256	5.61
	1896	1,523,846	4.82
Victoria	1870	10,761,887	4.83
	1880	10,360,285	5.11
	1890	12,692,943	4 38
	1894	*13,180,943	5.98

*No estimates made since 1894.

NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION.

ANNUAL MEETING.

The New England Cotton Manufacturers' Association held its annual and 64th meeting at Chipman Hall, Tremont Temple, Boston, Mass., Wednesday and Thursday, April 27 and 28, with a large number of members in attendance.

The annual meetings of this association are almost exclusively devoted to business, and much less to pleasures, as usually attend the fall meetings.

There were two sessions held on the first day of the meeting, one in the forenoon and another in the afternoon, and the same proceeding was followed the second day. The meeting was called to order promptly on time by President Russell W. Eaton, who opened the transactions with the usual president's address, followed by the report of the secretary and treasurer, which shows a healthy financial condition of the association. The earnings of the association for the past year were $5,283.08, and the expenses $4,333.85, showing a gain of $949.23. For the year ending April 1, 1898, the number of members enrolled was 523. Eighty-three members were elected in 1897-98, being the largest number of any one year, with the exception of 1895-96, when 142 new members were added. Indicative of the progress that has been made by the association in its discussions, the number of pages given to its published transactions in 1897 was 786, against 105 pages in 1890. The expenses of the association have increased from $926.08 in 1890-91, to $4,333.85 in 1897-98.

The first paper read at the meeting was that by Jones S. Davis, of Holyoke, Mass., of which the following is a partial report.

FLAX CULTURE AND THE MANUFACTURE OF LINEN TO TAKE THE PLACE OF COARSER COTTONS IN NEW ENGLAND.

In the proceedings of this association for several years back we find Southern competition in the manufacture of coarser cottons mentioned with growing emphasis. This is not the time to discuss in detail the causes which enable Southern manufacturers to compete successfully in the making of the lower grades of cotton goods. Some of these causes are well known to you all, while others are as yet only vaguely apprehended even by the Southerners themselves. Recognizing the fact, it is our purpose today to inquire what we shall do about it.

Will the manufacture of linen goods pay? It is conceded that next to cotton, flax is the most useful and valuable of all commercial fibre. It would seem that all that is needed to introduce the cultivation of flax into this country on an extensive scale is the providing of a market for the fibre. This last leads, naturally, to certain considerations in manufacturing in our country that favor flax culture and the linen and lace industries. Southern competition in the coarser cottons has already been hinted at. It seems inevitable that the manufacture of coarser cottons will be gradually transferred to the South. Indeed, if this movement towards the South continues at the increased pace of the last ten years, the South will be making the larger part of the coarser cottons manufactured in this country. The New England cotton manufacturers must face this fact squarely, and with

the same indomitable courage and enterprise with which they have faced the many obstacles of the past.

There is a large consumption of linen goods in the United States, amounting at the present time to nearly 50,000,000 of dollars annually. The fact has been pointed out also that cotton can never wholly take the place of linen goods; that instead the consumption of linen goods in proportion to cotton goods in civilized countries is steadily increasing. With these facts before them the New England manufacturers will not long delay making a thorough experiment in the manuacture of linen fabrics.

After a careful examination of all that has been written upon the subject and as a result of personal investigations covering the period from my visit to Ireland and the continent for special investigation in 1851 to the present time, I venture the following practical suggestions about how to proceed in the establishment of the flax and linen industries in this country.

A committee, representing a body of capitalists of adequate resources, such, for example, as our New England Association, is an absolute prerequisite as a preliminary step. Such a committee, with a paid secretary who should devote his whole time to the business, should address itself at once to the following tasks. First, they should acquire by lease or otherwise a plant sufficiently commodious for adequate experimentation, in a locality where a score or two of farmers are willing to grow a definite number of acres of flax each. The committee should have power to import the very latest and best machinery, both for scutch mills and for the manufacture of linen goods. When such a committee is ready to proceed, backed by such an organization and by the representatives in Congress of such a constituency as New England boasts, there is no doubt that adequate protection in the form of a tariff on importations could be secured. Even without protection a beginning can be made, in the opinion of all experts on the question. But with protection, by making use of the abundant information at hand, there is not the slightest risk. Indeed, there is every reason to believe that financial success is certain from the beginning. Once sure of their ground through such an initial step, the committee should be authorized to acquire large tracts of suitable lands in the vicinity of present plants and water privileges, to which the industry may be extended as rapidly as is expedient, the distinct aim all the time being to supersede the making of the coarser cottons by the making of linen fabrics. As fast as the space now occupied by coarser cotton machinery can be utilized by linen machinery, the cotton machinery should be transferred to the South. This plan will secure to New England the great and remunerative linen industry to take the place of the coarser cotton manufacturing that you are bound to lose in the end, anyway, and will enable New England capital and brains to compete on equal terms on its own ground with the South, that is taking the coarser cottons from us on account chiefly, of certain distinct local advantages.

This industry is as certain to become one of the chief industries of the United States that our country is certain to continue to lead the world in manufacturing enterprise and progress.

This paper elicited much interesting discussion in which Col. Samuel Webber and Edward Atkinson took prominent parts. Mr. Webber's reminiscences and observations were highly entertaining and practical. Mr. Atkinson regarded linen as much inferior to cotton in a sanitary point of view, and as a substitute its future was not propitious.

* * *

The afternoon session was opened with a paper by Thomas W. Prior, Philadelphia, on "The Prior Roller Cotton Gin." This was followed by one from Stephen N. Bourne, Manchester, N. H., on "The Round Bale," and this

by a paper of which the following is an abstract, by George A. Lowry, Boston, on

THE LOWRY COTTON BALE.

Although these bales are pressed to a density of 42 pounds per cubic foot, the cotton has only been submitted to a pressure of 55 pounds per square inch, while the Bessonette cylindrical bale requires 1,000 pounds to the square inch, and the Morse compress 2,800 pounds to the square inch, for a much less density. The machine is unique in its simplicity, yet there are few mechanical engineers who agree as to the principle involved. Besides the driving mechanism, there are only three parts to the machine: a flanged sleeve which revolves on the shoulder of a stationary outer casing, and a slotted cap-plate bolted to it. The sleeve is first filled with cotton, sufficiently tight to give some pressure against the cap-plate. The sleeve is then made to revolve, and as the cotton is dropped from the condenser of gin on to the cap-plate, a few fibres become drawn into the slot by the cotton moving underneath, and these fibres being entangled with others, soon draw all the loose cotton into the slot under the rounded edge of the lip. This compresses the cotton and removes the air, and as there is no possibility of re-expansion (as there is in all other compresses) this machine gets its compression with very little exertion and holds all it gets. The inner sleeve is slightly funnel shaped, and gives resistance according to the extent of the narrowing or choking of the chamber and the length of the sleeve. A variation in the choke will make a variation in the density of the bale. In this way, by slightly altering the sleeve, cotton has been compressed to a density of 86 pounds per cubic foot. (Oak is 54 pounds per cubic foot.) The bale has an additional advantage in that it absorbs water very slowly. A bale dropped into the river absorbed 7 pounds in twenty-four hours, while a regular uncompressed bale absorbed 64 pounds in the same time. The simplicity of the construction and operation of this machine will permit its going into the hands of unskilled labor, and its cheapness will bring it within the reach of every ginner, making it a machine for the masses as well as the classes.

These three papers were discussed somewhat together by a number of the members present, and much interest was manifested in the subject, showing its importance in the estimation of manufacturers. There appeared no strong preference for any particular process or style of baling, but all were of the opinion that radical improvements should be made in the manner of putting up the cotton. The proper baling of cotton is a vital question in the economies of manufacturing, and the subject always stirs up a lively debate. In connection with Mr. Lowry's paper, there was exhibited the new bale referred to, and its opening was a matter of considerable interest to the members, particular attention being called to the fact that the bale opened spontaneously upon cutting the binding wires, and that it contained no felted or matted cotton and had almost no tare.

The session was brought to a close with a paper, of which the following is an abstract, by A. T. Atherton, Pawtucket, R. I., on

THE EXCELSIOR SPINNING FRAME.

This method of spinning was devised for the purpose of doing away with roving frames, in the spinning of the coarser counts of yarn; that is, the product of the slubber is placed in the creels of this frame, to be spun into yarn thus saving a large portion of the cost of roving machinery in the first place, and being also a means of economy subsequently in saving power and wages. Although it might at first appear that the loss of the doubling on the fly frames would effect unfavorably the evenness of the yarn, the fact is that the yarn spun by the Excelsior process is as even as, and sometimes breaks stronger than that spun from roving which has undergone the un-

even stretching process of fly frames. Many carders have tried to prevent this unequal stretching, and the resulting injurious effect which the flyer usually exerts upon the roving; and it is only by the use of exceptional care and the highest skill that success has been attained in this direction. When this point is considered it is not so remarkable that, in spinning yarns up to No. 20s, the Excelsior system has proved uniformly successful and it is more than possible that it will be proved economical on even higher numbers.

The Excelsior system consists essentially of drawing the roving between the back and middle rolls to the extent usual on roving frames and then, by a patent condensing motion, preparing it for the spinning draft, which takes place between the middle and front rolls; thus obtaining in this frame, the roving drafts, multiplied by the spinning frame draft, without the usual bad effects which are experienced when excessive spinning frame draft is attempted in the usual way, because the latter is practically wholly obtained between one pair of rolls, namely, the front and middle ones.

The condensing guide placed between the front and middle rolls, receiving its motion from the same source as the roving traverse on the back of the rolls, is so shaped as to be self-threading whenever the roving is broken back, and as this does away with the need of extra care on the part of the spinner, it is a very important feature of the frame. The condensing guides are made of brass, and adjustably attached to a steel traverse rod, so that when once set on the rod and connected to the back roving traverse rod, it requires no further attention. The simultaneous action of the two traverse rods is an important feature, inasmuch as the possibility of straining the roving unevenly is thus entirely obviated. To ensure uniformity of draft, without undue weighting of the rolls, the back top rolls are made metallic and carefully fluted. The draft gearing on this frame is arranged so that changes may be made in the draft between the back and middle rolls, as well as between the front and middle, so that a total draft of 40 may readily be obtained if necessary or desirable.

* * *

Thursday's forenoon session opened at ten o'clock with the reading of a paper, of which the following is an abstract, by Edward A. Mongeon, Blackstone, Mass., on

STEAMING FILLING.

The object of steaming filling is to set the twist in the yarn so that it may be woven into cloth, and not have the yarn kink in the cloth.

In the early history of cotton weaving, cop yarn was allowed to stand for a considerable length of time in some convenient damp place, wheel pits, usually, to set the twist. This method proved sufficient for small mills, but large mills could not spare room enough to set the twist in this way; the large amount of yarn required to keep them running eventually resorted to the use of steam for setting the twist and this method is still in vogue in most of the cotton mills.

There are but few steam boxes that will not spoil a large amount of filling each time steam is admitted to them. I will name four causes; first, stained cops, caused by stained water falling from the ceiling of the box; second, soft cops, caused by intense heat admitted to the box in order that the filling may be steamed in a short time. The intense heat closes up the spindle opening in the cop, causes it to feel soft, and many of them are stabbed by the weavers in trying to put the spindle through the cop. These cops are then consigned to the waste box, or thrown under the loom to be made dirty, then to be swept up and sent to the waste house as sweepings.

Third, stained yarn on the paper tubes. This is caused by the high temperature which stews the oil out of the paper tubes, this in turn staining the yarn on the tube, making dark oily streaks across the cloth from one-

sixteenth to one-fourth inches in length.

Fourth, filling boxes are spoiled by being subjected to such intense heat. It stains the wood in time, and this wood in turn stains the filling which may lie on the sides or bottom of the box, as well as shortens its usefulness as a good filling box.

To overcome this waste of material I experimented with a patent atomizer, and was very much gratified to find that the twist in filling yarn could be set in about three and one-half hours by admitting a small amount of steam, in a tight box, through one of these atomizers. After experimenting with this atomizer a sufficient time to be convinced that I could accomplish what I had in view, I had a tight box constructed large enough to hold fifteen hundred pounds of filling, and so arranged that the filling boxes did not touch each other. The box is made of North Carolina hard pine seven-eighths of an inch thick, plowed and matched; the floor laid sloping from the sides to the center and covered with zinc and a drip leading from the lowest place. Near the top of the box on the sides are ten one-inch holes, these to allow hot air to escape and assist in circulation. I then placed six atomizers around the box, three on either side, and about ten inches from the floor of the box. The nozzle of the atomizers were placed in the centre of a one and three-quarters-inch hole bored through the side of the box. As the steam rushes through this opening it causes a large amount of air to rush into the box at the same time. This supply of air assists in making a very heavy fog inside the box and also helps to keep the temperature low, which has never exceeded 110° Farenheit, inside the box. One can enter the box at any time if need be without any danger of being burned, and this when the steam is fully turned on.

I have been using this new box for fifteen months with the very best of results, and have reduced my cop waste account nearly one-half.

I never see any stained cops and they come out of the steam box as hard as when placed in the filling box in the mule room. Neither do I have any dark streaks across my cloth from the last end of the cop.

This paper was followed by the reading of one, an abstract of which follows, by Randolph Crompton, Worcester, Mass., on

THE SHUTTLE SHIFTING LOOM.

In Mr. Nichol's paper, "Recent Advances in Weaving," delivered at the last annual meeting of this Association, among other things, he touched briefly upon the Crompton shuttle shifting loom. At that time, the loom was in its infancy. We feel now, however, that this experimental stage has passed and that the automatic loom as it stands today is a simple, practical machine, one which will make the manufacturer of plain goods able to obtain a greater production at a decidedly less figure.

The changes we have made on this loom during the past year, by which its working parts have been reduced fully one-half, consist of the entire elimination of the drop box cylinder; where we formerly used the pattern chain to start the box motion, a direct connection from the filling fork is now employed; the doing away with the spindle, substituting the leather picker for the raw hide picker as used on fancy looms.

Without doubt the most difficult and important change made was the substitution of the square leather picker for the raw hide picker. It is necessary to use the raw hide picker on drop box work in order that the boxes may be actuated up or down, as the case may be. We feared at first it would be as essential in this automatic loom, as the auxiliary box takes the place of the running box in order to change the shuttle, and in that respect is similar to the drop box loom; but by the adoption of the feeder for the auxiliary box we were enabled to overcome all other obstacles. It is conceded, I believe, that

one weaver can tend from four to eight ordinary looms, acording to the class of goods to be woven. By the use of this mechanism one weaver can attend fourteen 28-inch looms on print cloth 64x64. This has been demonstrated several times, and at our Green Street works this number can be seen in constant operation attended by a single weaver. Some manufacturers who have seen the looms referred to in operation, believe it is possible to increase this number to sixteen, producing no bad results from the addition. Our confidence in the ability of a weaver to do this has been greatly increased of late, for in the South one operative, but three months a weaver, ran thirteen 54-inch looms weaving goods 80x84.

The paper was followed by one, an abstract of which is given below, read by George F. Tryon, Fall River, Mass., on

SLASHING.

Slashing was first introduced into this section of the country about 1870; in 1869 the U. S. Flax Company of Central Falls, R. I., a mill operated by the A. & W. Sprague Manufacturing Company sent some yarn to Lewiston, Me., to be slashed, and four warps were returned. It required the services of four weavers and one loom-fixer most of the time to keep those looms running. But little progress was made for one or two years after that, but in 1870 some slashing was done, and in 1872 and 1873 it began in earnest to take the place of dressing. The principal reason why there came to be a demand for this change was both on account of the difference in the cost of labor and more uniform results. One dresser formerly would only supply warp for about 100 looms on ordinary sheetings, at a cost for labor of from $18 to $24 per week, while at the present time one slasher will supply warp for from 500 to 700 looms on same class of goods, at a cost for labor of from $9 to $12 per week.

There is not one per cent. of the soft and hard places with slashing that there formerly were with dressing, and where it required the constant attention of at least five men for every 500 looms, it now only requires one man to do the same work.

Good warping is an absolute necessity to the success of good slashing. Much depends upon the making and the proper cooking of the sizing. Some claim that it is just as well to dump all the ingredients into a tank of cold water as it is to mix thoroughly and put into the tank after the water has been warmed. I prefer the latter plan; after mixing bring to a boil and cook till it is ready for use, the length of time for cooking depending on the kind and quality of starch used.

The best covers for slasher rolls is an all wool 18-ounce blanket for the back roll and a plain weave all wool 12-ounce blanket for the front roll, both blankets being an open weave so as to retain or eject the sizing; the office of the roller cover being to assist in penetrating the yarn with the sizing, and after the yarn passes the front roll there should be very little sizing on the outside of the yarn.

* * *

Quite a lengthly discussion arose under this subject, as one in which many improvements have been and can be introduced, notwithstanding it has long been in practical use in mills. Some excellent ideas were brought out in the remarks made by F. M. Messenger and John Eccles. This was followed by a paper, an abstract of which follows, prepared by Arthur Parkinson, New York, on

THE BASTARD REED FOR COTTON WEAVING.

This question is one of much importance, especially to fine goods manufacturers. The bastard reed system is not in practice in this country. This method, however, is somewhat old in Lancashire weaving districts.

A "bastard reed" is a queer name for it. It is a reed which is made with less dents on the ends than there are in the middle—about five or six inches on each end, according to the

amount of contraction and the number of threads to the inch. The object of this is plain to every one who understands cloth construction, and who notices these "little matters," for in weaving, especially fine goods, or any goods requiring a great number of warp threads to the inch, a reed which has an equal number of dents to the inch all the way across, will deliver more threads a few inches on each side of the cloth than in the middle; for in weaving the cloth contracts towards the centre. Now if there are fewer dents to the inch a few inches from each end of the reed (which is called a bastard reed), the number of warp threads will be the same on the sides as in the centre of the cloth, or exactly as the goods are called for.

If an order of goods is stipulated to contain 88 threads to the inch, is there any necessity of making them 90 or 92 threads to the inch, as is the case (a few inches from each side of the cloth) when using the regular reed? Therefore it is very interesting to know why so many mills manufacturing cloth are so willing to give the buyer more than he calls for. In fact, when counting threads to the inch, I always thought it practicable to place the glass on the sides of the cloth, as well as in the centre and count both ways.

The saving by using bastard reeds is not a small item. Say for 40-inch cloth and making goods about 90 threads to the inch, I estimate a saving of over 20 threads to each warp. Of course that will make a slight difference in the weight of the cloth, but it is easily offset by sizing a trifle heavier, say two per cent. stronger, and a little stronger size, if smooth, will make the yarn weave better. In weaving very fine goods that call for 130 to 180 threads to the inch, a greater saving will of course be effected by using bastard reeds.

The afternoon session was opened at two o'clock, with the reading of an excellent paper by Christopher P. Brooks, Director of the Lowell Textile School, on "Our Export Trade in Cotton Goods." This was followed by the reading, by title, of a paper on "Cotton Mill Costings," by William Whittam, Jr., Charlotte, N. C. This paper can be better read in type than listened to in delivery, as it consists almost entirely of tabulated statistics. It will appear in the Transactions of the meeting, as they will be published.

This was followed by a paper on "Early Inventions Upon Copper Printing Rolls," by Col. Samuel Webber, Charlestown, N. H..

The meeting was brought to an end by the reading of a paper by Malcolm Campbell, Woonsocket, R. I., on "What I Don't Know About a Cotton Mill." This proved to be one of the most interesting papers of the series, and appears in this magazine, printed separately from this report.

LIST OF OFFICERS FOR 1898-99.

President: Stephen A. Knight, Providence, R. I.

Vice-Presidents: Fred C. McDuffie, Boston, Mass.; Henry T. Whitin, Northbridge, Mass.

Directors (for three years): George F. Whitten, Manchester, N. H.; John Tempest Meats, Taunton, Mass.

Director (for two years): Charles H. Richardson, Clinton, Mass.

The following were elected to membership:

For Active Membership: B. A. Alexander, supt. Boston Duck Co., Bondsville, Mass.; Daniel Moore Bates, Jr., asst. supt. Joseph Bancroft & Sons Co., Wilmington, Del.; J. H. Blades, supt. Lorraine Mfg. Co., Westerly, R. I.; A. W. Brainerd, agt. A. N. Slater Mills, Webster, Mass.; Edward T. Garsed, treas. Hucomuga Mills, Greensboro, N. C.; James Gee, mgr. Interlaken Dye Works, Fiskville, R. I.; David Grove, supt. Dyerville Mfg. Co., 610 Manton Ave., Providence, R. I.; Albert C. Hoy, asst. supt. Hamlet Mills, Woonsocket, R. I.; C. W. Johnston, treas. The Highland Park Mfg. Co., Charlotte, N. C.; George A. Mebane, sec. and treas. Asheville Cotton Mills, Asheville, N. C., and pres. Spray Cotton Mills, Spray, N. C.; R. S. Reinhardt, treas. Elm Grove Cotton Mills, Lincolnton, N. C.; Charles M. Sears, agt. Atlantic Cotton Mills, Lawrence, Mass.; N. G. Simonds, treas. Naumkeag Steam Cotton Co., Salem, Mass.; James Herbert Smith, supt. Quinebaug Co., Danielson, Conn.; Arthur Whittam, supt. The Enterprise Cotton Mills, Orangeburg, S. C., and John H. Whitten, supt. Stark Mills, Manchester, N. H.

For Associate Membership: Henry C. Clark, mill supplies, Providence, R. I., and George A. Lowry, consulting engineer, Planters' Compress Co., Boston, Mass.

Invitations were extended to the

members of the association to visit the Museum of Fine Arts, Boston,—to examine a fine collection of textiles, in addition to other works of art,—and the Lowell Textile School, Lowell, Mass.

Building and Equipping a Cotton Mill.

Paper read by Malcolm Campbell, Woonsocket, R. I., at the New England Cotton Manufacturers' Association meeting, April 27-28, 1898.

The main building of a cotton mill should not be over three stories high, with weaving shed connected by means of a fire-proof covered run, said run on hallway being located near the elevator. The shed should be at least twenty feet from the main mill, with a fire-proof wall for end, said wall caps to be made of iron or stone to protect it from the weather.

The shed should be constructed with a saw tooth roof for the purpose of diffusing light; the main building constructed on any of the well known plans, but I should prefer the Lockwood style of floor beams, with the exception that the intermediate beam be carried to the centre of double window frame and there supported by an I beam extending down to the window stool. This will give the beam a strong support and not in the least unsightly. I would advise the use of steel I beams. There would be no shrinkage in them to allow machinery or floors to settle, and the only objection I know of to their being used is, that they might sag in case of fire; but, who would not rather run that risk, which is but a minimum with our well protected mills by first-class systems, than run the risk of shrinking beams and settling floors; fire systems of which we owe the credit of adoption to the manufacturers and the originating of the plans to Messrs. Atkinson and Whitin, who, if I remember correctly, were the first men to farther and push this great enterprise, saving the manufacturers thousands of dollars on insurance and also spurring them on to keep cleaner and better mills, as I do not consider that any factory should run that is not kept up to Manufacturers' Mutual Standard.

The power house should be located conveniently to the mill, also conveniently to the railroad, so as to have the least amount of handling of coal. I would advocate the steam engine and electric generators as the prime movers and carry the power to motors in mill, the said motors to be located on the ceiling over the spare floor in the centre of the rooms in long mill, and at the ends in short mills; the motors located far enough below the ceiling to be handily oiled and operated. Each main line should have a separate motor and each long counter-shaft should also be drawn by a separate motor, having all switches located on the wall, convenient so that the overseer or secondhand could operate easily in case of danger or accident, by the use of electricity. The extra heavy shafting, pulleys, and belting are all done away with and the fire risk reduced, as the power can be isolated from the main buildings.

Picker rooms today, I think, have reached the standard of perfection and I strongly advocate the opening of cotton one week in advance before it reaches the feeders attached to the picking machinery. This opener should be connected by a short trunk, of not less than 10 feet or over 15 feet in length, to the first breaker. From breaker the cotton should pass to intermediate lapper by doubling four into one, thence to finisher with same amount of doubling. This will insure every time an even, clean lap, providing you have given the fans an ample dust room, with at least three square feet of outlet to each fan.

It is but six or eight short years ago that cotton manufacturers complained that first-class carding engines were not built in this country, but today there is no need of any such complaint because the machinery manufacturers have built at a great expense to themselves a carding engine equal in all respects to any made in the world. Now, have the manufacturers of cotton done their part?

Stop and think for one minute! You buy an expensive and accurately made machine that is built to be adjusted to a few thousandths part of an inch and set it on a floor that will settle and give more or less each and every day with the weather. You expect this finely made machine to do good, accurate work. If you want good, first-class carding, set your carding engine on a foundation made as firm and solid as you make the foundation for your steam engine. You will then not only get extra good carding, but the repairs for your cards will be reduced to such a small amount that you will hardly know that you have any in your mill. Carding rooms should be located on the ground floor.

Drawing frames, although the simplest machines in the mill, are about the most important and have given the machinery manufacturers no small amount of trouble and expense to perfect, but that has now passed over and a first-class machine may be had.

Fly frames should be located with cards and drawing and have equally as good a foundation to insure long life and smooth working with a small amount of horse power. I have now in mind a mill where the frames were set lengthwise with the floor beams, and in one year they settled, as also did the beams, one inch. This was in what is termed "a modern mill," built to see at how small a cost per spindle it could be done for, and not to see how low the running cost could be made, which should be the all important factor.

In selecting a fly frame, care should be exercised to get one that will give the most even tension to the sliver, and look out for lost motion caused in the gearing by reverse of bobbin rail; also see that proper differential gearing, oiling arrangements, roll stands, cap bars, fine adjustments to cone belt traverse, etc., can be produced.

We have had at some of our late meetings very valuable papers read on the spinning frames, papers that great care and no expense had been spared to get them in proper shape, and they certainly were and are today of great value to the cotton manufacturers and a credit to their writers. But I think there has been and is today a great mistake made in the system of banding of these frames. I would advise the system used by all worsted mills on their frames, i. e., banding four spindles with one band by means of binder or idle pulley which swings on an arm hung on a rod under the frame near the cylinder. If this system was used, we would hear no more about slack twisted yarns, tight and loose band, weather affecting the bands, extra large amount of horse power consumed by bands being too tightly put on, tight bands in damp weather, complaints that the bands were put on too slack, or too tight, as I used to put them when working in the spinning room. To be sure, they were tight enough so I would not be sent for because the new band just put on had got too slack. I would advise the mill men of this country or any other to look well into this system of banding. The spinning room I would locate on second floor of mill and use the third floor for spooling, warpers, drawing-in, etc.

—Before woolen manufacture was introduced into England by the Flemings, English-grown wools were exported to the Continent and manufactured there. After its introduction, legislative attempts were made in various ways to compel the use of English wool for all purposes, without regard to its relative unfitness for some of them.

—The object in making a worsted is to lay the fibres straight, side by side, like so many pieces of wire; whilst that of the broadcloth, beaver, or melton, is to keep the fibres pointing to every point of the compass when producing a yarn.

—Hard and firm cloths require freely felting wools, whilst soft textiles require those which felt slowly.

Testimonial to the Textile School.

The sixty-third annual meeting of the New England Cotton Manufacturers' Association, held at Philadelphia, last October, was made memorable to the members by the hospitalities and courtesies of the citizens of that city, and more particularly by the attentions which were extended by the trustees and officials of the textile school connected with the Pennsylvania Museum and School of Industrial Art. The members of the association were much affected by these evidences of kindly feeling, and felt that they were deserving of more than the usual resolutions of thanks that were extended to the school and the citizens of Philadelphia, and in order to signify their appreciation, a number of contributions were made by those who were present at the meeting for the purpose of obtaining a suitable testimonial, for which the bust of George Draper was finally selected, which was cast by the Gorham Mfg. Co., Providence, and presented to the textile school with proper ceremonies, Apil 15. This bust we herewith illustrate stands upon a polished granite pedestal, as herewith illustrated. It was designed by a member of the association, on lines of the Ionic order, bearing the following inscriptions.

On the front.
A TESTIMONIAL TO THE
PHILADELPHIA TEXTILE SCHOOL
IN COMMEMORATION OF
THE SIXTY THIRD MEETING
OF THE
NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION
OCTOBER, 1897

On the right.
GEORGE DRAPER
1817 1887

On the left.
MECHANIC
INVENTOR
MANUFACTURER
PUBLICIST

The address of presentation was delivered by C. J. H. Woodbury, secretary of the association, from which we make the following abstract:

"The most careful consideration of all the possibilities and suggestions reverted to the adoption of the first thought that the bronze should portray some member of the association whose career was a represetative one of New England life in the cotton manufacture, and that one was a living force in the textile industry of America whose presence is as of yesterday.

"George Draper, of Hopedale, was an illustrious example of what this testimonial is meant to represent. In the line of an honorable ancestry denoting skill, industry, and integrity,

he followed in the footsteps of his forefathers. In early life he toiled in a cotton mill and mastered the process of manufacture, and also the work of repairing and installing cotton machinery.

"While a young man he established the works which made Hopedale known wherever cotton is spun by power. The fertility of his mental resource is indicated by the fact that he received about one hundred patents, and beyond this his training and talents imparted a thorough mastery of the subject which enabled him to give the final touch which transmuted many other ingenious devices from failure to success. It is safe to say that the product of his works are in every cotton mill in America, and extensively used abroad, and his improvements constitute an essential feature in reducing cost or increasing production.

"In the administration of his extensive affairs he was prompt, honest, and just. Prosperity blessed, but did not change him. He was a yielding man--as long as he had his own way, —having wisdom to plan and force to execute the affairs entrusted to him. A broader element of his nature of more permanent importance than his inventions, because in the progress of the art his inventions will be superseded by others, even as they took the place of what preceded them, was the ability in connection with the energetic exploitation of the product of his establishment, with which he advocated a keen analysis of the results from machines, and through this channel to increase the system and efficiency of mill supervision. Men who were brought up in his shops were sought for positions of responsibility and trust in cotton manufacturing, and this Association, and in his daily meeting with members in business, the trend of his finely organized intellect was toward a higher standard of supervision and system in mangement, and the administration of the American cotton industry is improved through his efforts.

"His active mind was not limited by his business, but reached out into public affairs, applying the same mental traits in embodying a purpose in the functions of government. Later in life the philosophic element of his nature became more prominent, particularly in political economy, in which he applied his power of analysis in application to every-day affairs. He mastered the principles of tariff and finance, and assimilated the problems so thoroughly that they became a part of his being to such an extent that he would replace conventional modes of expression by examples in terse phraseology peculiarly his own. He was especially active on matters pertaining to the establishment of the tariff on lines best adapted to the conditions of the American people. He founded the Home Market Club, and was its first president, and devoted himself to its purposes."

The gift was accepted on the part of the school and museum by Chas. H. Harding, a member of the board of trustees, followed by an address by the secretary of the Home Market Club, Boston, who gave some particulars of the life of Mr. Draper, the first president of the club.

Unsatisfactory Cotton Bailing.

As noted by us in our last month's issue, James Macabe, chief cargo surveyor of the Liverpool Salvage Association, and of the Lloyd's, of London, and also a representative of the New York Uuderwriters' Associaion, is now in this country, visiting the principal points of shipment of cotton to European ports, with the avowed purpose of investigating the causes and suggesting remedies for the unsatisfactory baling of cotton, which make cotton cargoes undesirable as insurance risks. Whether Mr. Macabe will be instrumental in effecting the necessary improvements is questionable, as efforts in the same line have been attempted for at least twenty years or more, or as long as we have been fa-

miliar with the cotton trade. Mr. Macabe is reported as saying:

"There is no doubt that the present agitation in regard to procuring a uniform bale for American cotton is a great move in the right direction. There seems to be little or no argument in favor of the round bale, and as the square bale is found to in every way answer its purpose, in the case of East Indian and Egyptian cotton, there is no reason why a square bale should not be as satisfactory with American cotton, provided, of course, that a uniform bale is obtained, and also greater density than with the present unsatisfactory bale. I think that the proposed uniform bale will tend to the better condition of the cotton when it reaches the other side, but no system of baling will prevent country and wharf damage unless protection is given to the cotton.

I have in several cases actually seen cotton that has been lying exposed to the rain for several hours compressed in its wet condition and shipped out of the compresses on to open drays (in many cases with no tarpaulins) and sent down for delivery to the steamers at the open levees in the pouring rain. In some cases this cotton has been received by the different ships and put under tarpaulins in its soaking condition to be loaded on board the next day. It would be an absolute impossibility for this cotton to dry out sufficiently not to further damage in the high temperature of the steamer's hold.

"In other cases I have seen the cotton left on the drays all night, with a tarpaulin on top, but exposed at the sides, to be delivered to the steamers next day. I have unfortunately found draying of cotton nearly general all over the city in rainy weather, and we have also been sorry to find that some of the Cotton Exchange inspectors have a very vague idea as to what is a wet or damaged bale. I have seen hundreds of bales pass as sound that would not be received as sound in Europe.

"With this state of things going on in the pioneer city of the South, it is scarcely to be wondered at that both foreign and American insurance companies are hesitating whether they will continue to cover country damage. The underwriters feel that the railroads do not give sufficient care to cotton while in their charge, and this is particularly the case with certain roads, which will, of course, necessitate the underwriters declining to cover by those roads, except at extra rates, or declining to cover by those roads at all. If all the underwriters decline next season to cover country damage, the shippers will have to pay such losses, which will result in their being more careful over which roads and by what steamers they ship, and in the event of damage, making the road or line responsible for the damage pay the loss."

In speaking of the round bale, Mr. Macabe does not seem to have a very high opinion of it for transportation purposes. He said that the round bale was superior in many respects to the old style, but that it had many disadvantages. In the first place, the system of packing was bad, it being rolled together much as a blanket would be, that it could not be screwed into a ship's hold so easily.

"Then, when once in the ship," said he, "on account of the circle shape of the bale, there is a free passage of air through the entire cargo, and in case of fire you can appreciate the great danger."

Mr. Macabe says that what this country wants is a medium-sized bale. He would hold the Egyptian or the East India bale up as models.

Mr. Macabe's views concerning the round bale harmonize with ours, in that its form is its most objectionable feature. This is the only thing, however, about the bale, that we think is particularly objectionable, due, mostly, to the disadvantages of packing it properly into the holds of vessels, and for other transportation purposes. Still, the form has advantages, which we think would be more fully appreciated by manufacturers if they would go to a slight expense of equipping their mixing rooms to receive and unroll the bale.

Trials of a Factory Shareholder.

We find in one of our exchanges a communication from a shareholder in several Fall River and New Bedford corporations, describing his experience as an investor in mill stock, which is not often considered by those who think that capital is receiving all the benefits and pleasures of manufacturing, and that labor has to bear all the losses. In substance, this shareholder says that he has investments in ten mills, eight in Fall River and two in New Bedford. They are all solvent, fairly successful institutions. On Feb. 1, 1896, when his annual schedule was made up, the par value of his 534 shares in the ten mills was $53,400; the cash market value on the basis of the latest sales, $57,080. On Feb. 1, 1897, the inventory showed a market value for the same stocks of $54,830, a decline within the year of $2250, or 3.9 per cent. The dividends during the year amounted to $1782.50, equal to 3 1-3 per cent., upon the par value, or 3 ¼ per cent. upon the market valuation of Feb. 1, 1896.

On Feb. 1, 1898, the annual inventory showed a market value for these same stocks of $42,625, representing a shrinkage for the year of $12,205, or 22.3 per cent. Dividends received during the year had been $1105, or 2.07 per cent. on par, and 2.015 per cent. on the market value of the stocks on Feb. 1, 1897.

Added interest is given to the testimony of this stockholder by his statement that, "I hold as guardian, trustee, etc., cotton mill stocks belonging to beneficiaries of testators and estates; and four-fifths of these holdings are by widows who need the income for their support; and what is true respecting the stocks held by me applies equally to those which I hold in a fiduciary capacity."

These are facts which many, as one of our contemporaries well says, who rail against the "capitalistic" classes in Fall River, Lowell, and elsewhere are seldom accustomed to consider. Only a part, and that not probably a very large part, of the stockholders in our New England cotton mills are persons of great wealth. The depression which has weighed upon the industry has sharply affected many other people besides the operatives. Their wages have been reduced 10 per cent., but the dividends upon which hundreds of women and children have relied for their livelihood have been cut one-fourth, one-third, or one-half—and in some extreme cases entirely suspended.

Knowledge of these truths ought to soften the asperities of labor conflicts. The better the one side understands the other, the less likely is occasion for such wasteful quarrels to arise.

Mill Crookedness.

All of our readers are undoubtedly well aware of the financial troubles in which certain New Bedford (Massachusetts) mills got into not long ago, and especially the disreputable operations that figured in the financial management of the Bennett and Columbia Mills. It is only quite recently that a report of the expert accountant, Edward L. Parker, was given publicity, by the receivers of these mills. This delay in giving out the report was due to prudential reasons. The report of the accountant exhibits remarkable cases of crookedness, showing how it is possible to conceal the financial status of the affairs of a large corporation even from those who are supposed to be in a position to know what is going on.

The report of Mr. Parker bears the date of June 10, 1897. In November, 1896, according to Mr. Parker's findings, $30,000 was apparently paid by the Bennett to the Columbia, and was credited by the Columbia, but the corporation did not actually receive it till February, 1897. Hadley's salary in the Bennett corporation, by the books, was shown to be $3500 previous to 1892, and $5000 after that, while L. E. Bentley, superintendent, had a salary of $4000 in 1892, and $7500 since 1895.

One expenditure reported by Mr. Parker was $7843.50, paid Dr. William E. Brownell, a director, for his per-

sonal indorsement of the corporation notes, and $14,000 was paid sundry parties for brokerage and $4000 for travelling expenses.

In the case of the Bennett, dividends aggregating $260,500 were paid, but not earned. In January, 1892, it appears that $44,300 was loaned H. A. Holcomb and returned five months later, and the interest, $969.29, was allowed him as an offset against notes indorsed by him.

From the figures at hand, Mr. Parker estimated that had there been no irregularities, the gross earnings of the Bennett corporation would have been $442,000.

The Bennett seems to have suffered much less than the Columbia, which was a heavy loser.

In the Columbia report, one of the most striking features was an apparent payment of $450,000 to C. E. Riley & Co., of Boston for machinery, which the Riley firm denies ever having received. Mr. Parker's report states that an attempt was made to conceal this misappropriation of the company's funds by using forged receipts written on printed forms of receipts and statements, which were close imitations of the forms used by C. E. Riley & Co.

Checks written entirely in the handwriting of the treasurer, payable to the order of C. E. Riley & Co., and bearing their forged indorsement under a stamp imitating their deposit stamp, and bearing what falsely purported to have been the clearing house stamp of the Third National Bank of Boston, at which bank C. E. Riley & Co. had their account, were also filed at the company's office with the fictitious receipts, and appearing prima facie to have been bona fide checks remitted to C. E. Riley & Co., and deposited by them, but the cashier of the bank states that none of the checks were received there. They were not negotiated in any way, but were substituted for the checks actually negotiated, and thus concealed the names of the real payees of the amounts. The accountant found various very questionable notes in connection with this deal.

Mr. Parker reported improper charges in the building account of $50,000. He also found that Hadley took for his own use $85,000 in November and December, 1896, which was returned in January and February, 1897. The amount was not shown on the books, but by shortage of the bank account. Of this $30,000 was taken from the Bennett Manufacturing Corporation, on whose books it was charged to the Columbia Spinning Company, and was credited to the Bennett by the Columbia, although the Columbia did not receive the money till February. The remaining $55,000 was taken directly from the Columbia.

In the Columbia, Hadley's salary appears to have been $5000 since 1895 and Bentley's as superintendent $7500 since the same time. In this coroprartion, Dr. Brownell, a director, was paid $13,721.25 for his personal indorsements of the company's notes; $8000 was paid for brokerage, $2100 for a Boston office, and $2400 for travelling expenses. Dividends were paid, but not earned, amounting to $101,250.

Mr. Parker estimates that there was a loss aside from that from irregularities amounting to $150,000.

The report deals with a remarkable cotton transaction, in which cotton belonging to G. H. McFarren & Bro. and R. H. Deming & Co., stored in the Columbia sheds, was peculiarly mixed up, a fire in the shed helping along the deception. The books showed that Deming's cotton had been used and paid for, while, as a fact, it had been used and not paid for, but the company represented to Deming that it had been burned and was not insured, therefore the corporation was not charged with it. This misrepresentation seemed to have some substantiation from the fact that, after the fire, the McFarren cotton was found in the Deming storehouse so badly burned that identification was doubtful.

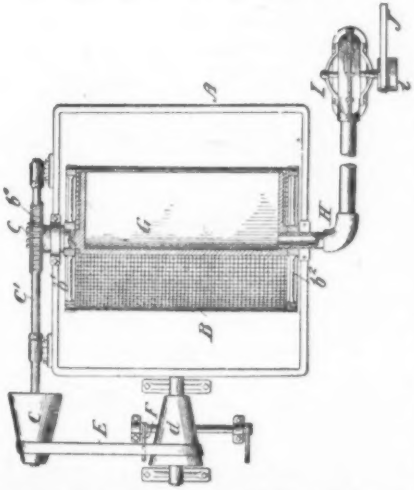
The reports deal quite extensively with the transactions of the corporations with Holcomb, but as much of this is in the nature of evidence, which is to be used in the trial of the case in the June criminal term of the Superior Court, it is withheld from publication.

Spraying Device.

The Philadelphia Textile Machinery Company, Hancock and Somerset Sts., Philadelphia, Pa., have recently secured the sole right to manufacture, under patents taken out by Pierre Lorillard, Jr., a new and ingenious spraying device.

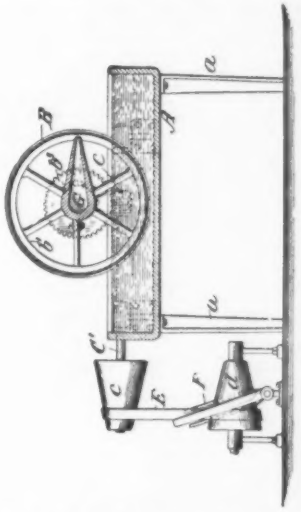
It is designed to distribute or deliver liquids in small particles and relates more particularly to machines for distributing liquid in minute particles upon tobacco, but it is applicable to the distribution of liquids in a similar manner for various other purposes, and also to mixing one liquid with another. The apparatus in its simplest form consists of a cylindrical screen of wire netting revolving, to a slight depth, in a pan containing the liquid to be sprayed.

As the cylinder slowly revolves, the liquid, owing to capillary attraction, adheres to the meshes of the screen and is carried up to a point from which it is forcibly blown off the netting by means of a blast of air emitted from a slit in the side of a discharge pipe; the latter being located inside the cylindrical screen parallel with its



axis and with the slit close to the netting.

The volume of the spray is under perfect control and may be varied at will, as it is governed entirely by the speed at which the cylindrical screen revolves, thus bringing the liquid more or less rapidly opposite the point of discharge as desired. It will be apparent that the uses to which such a device as this may be put are almost



endless. It will be found efficient in adding the flavoring in the manufacture of tobacco, for uniformly distributing oil on wool stock previous to carding, also for spraying cloth previous to calendering.

It is the especial desire of The Philadelphia Textile Machinery Co. to receive communications from parties interested in such a device with a view to bringing out its possibilities as to application.

The Silk Association of America.

The Silk Association of America, which has its headquarters in New York City, has been thoroughly reorganized, with a result that its field will probably be considerably enlarged. A list of the officers of the association is given elsewhere, in our Industrial News columns. One of the most important matters under consideration before the Association is a proposition to admit importers as members of the Association. Up to the present time membership has been confined to American manufacturers

or members of the trade identified with American interests. Some members of the Association, it is true, also import foreign goods, but these, it is understood, are also interested in American mills, so that thus far the strictly foreign importer has not been included in the Association. There is now, however, as just indicated, a disposition to admit such importers and in this way endeavor to make the interest of the entire trade, so far as possible, unified. One difficulty in the way of this move, however, is the active part which the Association has taken, and still proposes to take, in the prevention of undervaluation of foreign goods. This work has been one of the principal features of the Association. It is urged that with a large number of importers in the Association there would be a probability that the goods of some of these members would at some time be advanced by the customs officers, in which case the Association might be placed in the embarrassing position of having to work against one of its own members, unless it ceased to take part in such cases, which so far as learned is not proposed.

Efforts will also be made to secure a much wider representation of American manufactures. Several of the members of the Paterson Silk Manufacturers' Association, for instance, have already joined the National Association, and it is expected that others will do so.

The association was established in 1873. Its objects, as stated in its charter, are "the promotion and advancement of the silk interest in the the United States more effectually by the increase of information, by the interchange of ideas, by harmonious action, by the development of industrial art and by all other proper means."

—Astrakhans are made on various principles, but the old-fashioned method of using wires in weaving has now been generally superseded by a much cheaper method of production, and one which yields effects quite as neat and attractive.

Heavy Weight Fabrics.

CHEVIOTS, WORSTEDS, CASSIMERES — DESCRIPTIONS AND PRICES.

It is always of interest, to the manufacturer, who wishes to keep well informed, to know the prices of the various makes which have been sold, for in this way he is made aware of what his competitors are doing, and from this knowledge, is in a position to take advantage of any new idea in constructing fabrics which may have been put forth. In these days of excessive competition it is necessary to meet it at every point, and one is only capable of doing this, when he has made a study of the requirements and the efforts which have been made to meet the same. There are few industries in which small details play such an important part, as in the manufacture of fabrics; and it is the attention to these items which makes the successful manufacturer. Take for instance several fabrics. In one, the maker saves in the amount of twist in the yarn, or the size of it, or in the percentage of the mix, and still produces a fabric which will command as right a price as one which costs intrinsically more to produce, but does not appear any more costly than the cheaper one.

This fact has never been more fully illustrated than during the present heavy weight season, when the advance in the price of raw material over the previous years, made it necessary to curtail expense of material used, also labor cost put into material, and the result has been, many sightly fabrics, which when analyzed are found to contain much foreign material, such as shoddy, flocks and cotton.

The maneuvering which has been done to place various lines of fabrics, has been interesting, particularly through and through worsteds, some manufacturers having the same styles in three or four commission houses. This case is cited as an example of the way business is being carried on by many.

The following prices are those of many of the fabrics sold, and are intended to convey some information as to the relative value of cloths.

In cheap piece dye fabrics, those which have had the largest sale, is one made by the Chester Woolen Co., and sold in black, twill weaves, for $1.00, and blue $1.05. This fabric is made of quarter blood stock, lustrous worsted warp, and worsted and wool mix filling. Washington Mills sold worsted cheviot fabrics at $1.10 and $1.30, also piece dye twills at $1.27½, $1.37½ and $1.42½. Joseph & Werner sold a piece dye, worsted and wool cheviot twill at 70 cents; Ould & Bigelow one at $1.05; and one made by Fletcher in black and blue at 90 cents. The Peacedale piece dyes were $1.35 and $1.55; and the Washington piece dye stripes and suitings were $1.55.

Wanskuck meltons in overcoating weight were $1.50, and suiting weight $1.42½. Wm Peters & Co's melton sold by Curtiss & Warren brought $1.42½. Globe meltons in black were $2.25, blue $2.37½, both less 5 per cent. Springville black thibet which is an excellent fabric was $2.87½. Hockanum worsted cheviots in black, broad twill were $2.12½, blue $2.25, and the finer weave was $2.37½ for black and $2.50 for blue. A thibet made by the same, sold for $2.00 in black, and $2.12½ in blue. The Peacedale worsted cheviots in cheaper grades were $1.30. The American Mills kersey was $2.12½ and $2.75; they also sold a twill for $2.00. The Dartmouth kersey sold for $1.30, and the Washington Mills for $1.52½, fancies $1.60 Stevens, Sanford & Handy had cassimere fabrics at $1.10 and $1.25. Holmes & Meinhard one at $1.20. Crown Mfg. Co., of Marcellus, New York, placed through Sullivan, Vail & Co., cassimeres at $1.10, $1.37½ and $1.50. Nostrand & Moore sold for R. Waterhouse & Son, of Greenville, Rhode Island, a line of cassimeres at $1.37½.

Beebe, Webber & Co., of Holyoke., Mass., sold a line of hair line stripes at $1.20 and $1.30; these goods contain a straight cotton thread. Peacedale Co., sold a line of cassimeres at $1.15. Stockton & Drowne, showed a line of cassimeres, called the "Elliotts," which sold at $1.12½. John & James Dobson a line at $1.05 made by E. Hoyle, of Millbury, Mass.

W. J. Dickeys & Sons had their usual line of cassimeres, which sold at 87½ cents less 10 per cent. The Milton cassimeres were $1.25. The Superiors, made by A. S. Sayles & Co., and sold by Jacob Wendell were $1.45. The North Adams cassimeres sold for $2.00, and the Oregon City Mfg. Co.'s in stripes at $2.25. Kunhardt & Allen showed the usual large veriety of novelty yarn cassimeres in prices as follows: $1.05, $1.15, $1.25, $1.37½, $1.42½, $1.50 $1.75. Clinton Woolen Mfg. Co., of Clinton, Mich., had all wool, hair lines and suitings at $1.00; the Irvingtons were also the same price and sold by Brigham, Lawrie & Mann.

The Weybosset cassimeres of Jacob Wendell & Co., were 90 cents, and those sold by the Moses Mfg. Co., in suitings, 85 cents and $1.10. Greeley, Frost & Cushman's line was $1.10 less 5 per cent., and Converse, Stanton & Co.'s cassimere stripes $1.25. The Hockanum Co.'s fancy worsteds were $3.62½ and $3.75, both less 10 per cent. and a line of silk mixes at $3.62½ less 10 per cent; the fancy worsted cheviots were $2.62½ less 5 per cent. "Durwins" worsteds made by Samuel Williams at East Greenwich, R. I., sold for $3.25 less 5 per cent. The "Teovils" sold by Schnabel Bros. for $2.50, $2.75, and $3.00 were also made by the above manufacturers, this line containing worsted "Bedford" and whipcords at $2.50. Globe worsteds, were $3.25 and $3.37½, less 5 per cent. and 5 per cent. Broad Brook, plain back whip cords were $2.25 with a fancy worsted back $3.00.

Oswego fancy back coverts were $2.12½ and the worsteds $2.37½. Perservance Worsted Co., Woonsocket, R. I. sold worsteds at $2.32½ and $2.37½ the "Minrocks" a line of through and through worsteds made by the same firm sold at $1.62½. The "Pall Mall" worsteds were $2.30 and $2.50; the "Aguilars" $2.12½; and the "McKin-

ley's" $2.10. The "Centrals" made by the Farwell Worsted Mills, of Central Falls, sold at $2.00; and the "Dunellous" by the same maker at $1.50. The Blackington Co.'s line sold at $2.50, $2.62½, silk mixes at $2.50, and a line of worsted cheviots at $1.75. Otto Schaller's worsteds which were so, in name only, being composed largely of cotton, sold at $1.10. Boessneck, Broesel & Co., through Oscar Hoffstadt's department, sold through and through worsteds made by Fletcher, at $1.45, which was the same price and the same line S. Stein & Co., had.

The "Leaders", also through and through worsteds sold by Rockfellow & Shephard were $1.75, and cotton filled. A fabric of the same character sold by Ould & Bigelow, and made by Fletcher, in all worsted was the same price. The "Beoll" worsteds sold by Oelbermann, Dommerich & Co., were $1.95 and $2.50 less 5 per cent. and 5 per cent.

"Maturch" stripes and suitings $1.62½, less 5 per cent, "Jupiter's" $1.10 and $1.37½. The "Shermans" made by Phillips, were $2.62½ and $2.75, with a line of whipcords at $2.37½. The "Puritans" were $2.25 and 5 per cent. Caeser & Co. sold through and through cotton filled worsteds at $1.62½. Thos. Dolan & Co., cotton black worsteds at $1.50 and wool backs, at $2.00. Stevens, Sanford & Handy had lines at $1.50, $1.80 $2.00, $2.07½, $2.12½, $2.25, $2.75 and 5 per cent. and a through and through cotton filled cloth at $1.62½.

Silver Lakes, made by Tillotson, which are the leading pants worsteds, were sold at $2.37½, $2.42½, $2.50, $2.62½, all less 5 per cent. Greeley, Frost & Cushman's cotton filled worsted stripes, were $1.50. F. Vietor & Achelis worsted suitings $2.37½, silks. $2.50. Kunhardt & Allen's, worsteds $2.50, $2.75 and $3.00. Converse, Stanton & Co.'s line were $2.32½. The worsteds sold by the Oregon City Mfg. Co. and made by Fletcher were $2.25. Bacon & Co.'s line was $1.50 and Libby's $1.30. The "Elmdale" kerseys sold by Stevens, Sanford & Handy were $1.62½ and. $1.87½ Duval, Cone & Glover's worsted were $1.30.

Textile Fibres.

Lecture by John Butterworth, delivered at Shaw, England.

(Continued from April.)

Many of you are aware that I have always laid great stress on the proper mixing of cotton, and I have reason for it. I have seen several plans of mixing—some of them cannot be condemned too much—and only one that gives the best results. I have seen some curious things traced back to the mixing. I will give you one or two illustrations on this point. No spinner needs to expect a regular yarn who mixes cotton waste with raw cotton in the usual way of making a mixing. I do not make this statement at random, but speak from experience, and I know it is a positive risk to mix these two classes of material together in any way except on the lap machine. You can put what I have stated here to the test if you like. Make some yarn for the manufacture of cotton flannel or flannelette out of cotton and cotton waste mixed together in the usual way of mixing cotton.

When the cloth woven from such yarn comes to be raised, to give it the softness and feel of flannel, you will no doubt find the fibre on some parts of the cloth properly raised, while on other parts the warp may be as bare as the palm of your hand. This phenomenon has occurred more than once or twice in my experience. I have here a small case containing two samples of cotton flannel, numbered one and two. Number two is woven with a coarse weft with the necessary twist for cotton flannels, and which should also present a good body of fibre to the teeth of the raising machine. It will then yield a good nap of fibre, completely covering up the make of the cloth, as shown by this sample. In sample number one, the weft is finer, hence it requires more twist and presents a less body of

fibres to be raised into a nap, and, as a consequence, the make of the cloth can be seen through the thin covering of fibre.

A manufacturer making pile goods recently requested me to give him an opinion upon a complaint he had had from the finisher of his cloth, to the effect that during the process of cropping and raising the pile, after the cloth had been cut, patches of the pile came out, leaving the warp almost bare. I was given full liberty to go through the mill and see every process, with the result that I found he was mixing a certain proportion of cotton combings in his mixing of raw cotton, and he could not have hit on a class of waste better suited to give the results he met with if he had tried his best. I suggested that, if he must use combings, or any other cotton waste, never to think of mixing it with raw cotton; but to make separate mixings of waste and of cotton, and mix the two on the lap machine. At the same time, I told him he must not expect that the loss in finishing would be as small as if cotton alone were used, nor would the pile look as full, but the other evil would disappear.

Woolen spinners who use cotton and wool never mix the two in a careless manner. They used to ask for the cotton in the carded sliver, and they put up so many slivers at the scribbler, thus blending the two uniformly together. I have made up thousands of pounds of card sliver to be sold to wool spinners. I think nothing illustrates this part of our subject so forcibly as the remark of an old Lancashire spinner who, when solicited to buy some card fly to cheapen his mixing, said: "Na'w al a nowt to do we't, if its flown once it'll fly again." But this was in days when card fly was not much inferior to cotton. But there is very little fly made now, and I often wonder if our yarns have not suffered as a result.

Something has already been said regarding hard or harsh cotton. This grade of cotton is not peculiar to any one country. There is a sample here from India, the whole of the seeds and fibre of which hang outside the pod or boll, the fibre holding together as tenaciously as if it were wool. At home I have a sample of unginned cotton from Malta, the seeds of which it is difficult to separate,, the fibre holds so fast together. All Levant cottons grown from native seed are naturally harsh. A considerable bulk of Brazilian and of white Egyptian are of the same style; these are now largely used for cotton hosiery or mixing with short wools. Cotton spinners are sometimes tempted to mix harsh cottons with the soft grades of American during seasons of scarcity or plentifulness of one or the other, but it is never with good results. The harshness and extraordinary coherent quality the different grades of harsh cotton possess is not due to any extra natural twist the fibre possesses over that of softer cotton; in fact the harsh grades have often less natural twist in the fibre. The cause of harshness is a structural one, and would make a subject for an entire lecture for anyone who chose to go into it. What is to be discussed here is the capability of such fibres for spinning purposes. The true position of these harsh cottons is in spinning hosiery yarns, and blending with wool for softening purposes. To mix them with softer grades and to expect a good level yarn would lead to complete disappointment; they never blend but part company at every opportunity, leaving the yarn full of weak thin places, and giving it a woolly feel whether such is desired or not. Very harsh cottons have been and are still at times mixed with softer grades to make specialties of cotton yarns which must have a woolly feel, but such yarns have to be spun on the wool principle before alluded to. I well remember many years ago vast quantities of yarn being imported to this country from Saxony to weave cotton winceys. In fact, the trade was so great that several spinners here contemplated going into it, under the impression that they could spin it by their usual system of

drawing rollers. Samples of this yarn were sent to me for examination, and to give an opinion how it was made. I saw at once that advantage had been taken of the short wool system of spinning, by which a little long soft staple cotton had been mixed with a very harsh and coarse short cotton; the long staple formed the core of the thread, and the coarse fibre clung to the outside. Sometimes the short harsh staple would be dyed, while the soft staple was left in the white, and in this form the yarn had a more distinct woolly appearance. No one in this country that I have heard of ever began to spin the yarn, and the Germans kept it till the fashions changed, when it died out. It, however, made a capital imitation of woolen goods. Such imitations used to be considered frauds, and so they are when represented as the genuine article.

Some little time ago a sample of yarn was sent to me by a party to whom it had been represented as a pure wool yarn. I was requested to examine it and report if it was a wool yarn, or if not all wool, what percentage of wool there was in it. I made the examination, with the result that I could not find a wool fibre in it. It was made from an undressed class of vegetable fibre, and in this undressed state possessed considerable asperity, which gave a woolly feel to the yarn.

I know two spinners, who both have the same class of machinery, and both go to the same market to buy their cotton; one can spin a yarn that will weave a fine grade of sateens without a blemish, while the other cannot spin a yarn that will weave an ordinary sateen without blemishes. I have been through the latter spinner's mill, and I dare engage to make a yarn on his machinery that will compete with his rival's and I would not alter a single thing outside the cotton mixing room, except to change a tooth to regulate counts or twist. I could enumerate other cases of this kind, but these are enough; they are not easy matters to deal with because every spinner knows his own business better than anyone else, and it is better he should think so rather than lose confidence in himself. In any case, however, the man who can make a yarn that will weave a fine grade of sateens is a good spinner. A yarn of this kind must be absolutely clean and level (as far as that term can be applied). It must also be soft and the fibres composing the yarn must lie as parallel as possible to give the yarn as much lustre as can be acquired. These are requirements that an outside manager can seldom attain to, unless he has had a considerable inside experience previously.

That my experience and my microscope still bear me out in saying, whatever difference exists in cotton, however slight, the same difference can either be seen or felt by a practised hand; and any difference that exists between two cottons also exists in the yarn made from them. I believe the Continentals understand the capabilities of textile fibres better than we do here. There are many structural features in fibres that are little understood yet, and there are also many peculiarities in the behavior of fibres in the spinning and manufacturing processes that are even less understood. With me cotton spinning and manufacturing have been a hobby as well as a business, and yet I can honestly say that with all I have seen and learnt of it, I feel that I know very little. Still every fresh case or difficulty in spinning and manufacture that comes before me stimulates my desire to know more.

Cotton Mill Labor in Bombay.

The cotton mill industry in India depends for its operatives upon the agricultural class, which from time immemorial has gained subsistence by field labor. This material, unpromising though it may appear, is the only possible source of labor in a country whose total population contains 70 per cent. of agriculturists. The conver-

sion of the rough-handed field laborer into a mill hand whose pay is perhaps four times that of his former earning, is a process of a few weeks only, and is materially assisted by the fact that the mill, especially if it be in a district away from Bombay, only produces low counts of yarn, at starting, and, as might be expected, his conversion to habits of regular attendance is a very much slower process. Both method and regularity are loathsome to him. His gaum or village is probably too far from the mill to allow him to live there, so he will either construct a hut for himself on the mill property, or pay for a lodging; and here begins his first experience of rent, which, however low, he regards as an imposition. It is no wonder, when he comes to Bombay, that he finds rents exorbitant. A single room here costs from one to three rupees (22 to 26 cents), per month, and even when he earns 14 rupees a month he will grudingly pay six annas (15 cents) a month for a small share of a little room in a densely-crowded neighborhood. It is this idea, combined with his disregard of all sanitary precautions, that has contributed largely to the present insanitary condition of Bombay where three-fourths of the people live in chawls or tenement buildings. Chawl property is the most profitable of all house property. its average net profit is 16 per cent. and some of it of the worst sort has been known to make a profit of 30 per cent. per annum. The tenant asks for no repairs, and cares neither for paint or whitewash. He cooks in his room without a chimney, using wood and cowdung fuel until the walls and roof are blackened. If smoke fumigation has any virtue at all, Bombay would never have been visited by plague. Many of the Bombay coolies have their wives and families with them, and when they are all able to join in mill labor, their circumstances are unusually comfortable, and in strong contrast to a life of field labor. Their total earnings may amount to 30 or 40 rupees per month, while their rent will not exceed 4 rupees or about one-tenth of their income. In the large cities of Europe the cost of rent alone is frequently one-fourth of the earnings of the workman. Habit and custom are however exceedingly strong in India, and nowhere stronger than among poorest people. As the Bombay mill coolie uses neither chair nor table, his furniture is of the simplest. A whole family may occupy a room ten feet square, and if the first wife is childless there may be a second—who generally takes the leading place. A bedstead of jungle wood and twine, and a few sheets and cotton quilts (which are put out of doors in the day time), a fireplace of mud, and a few brass or clay vessels for cooking or water-supply, constitute the furniture. A medicine bottle filled with kerosene, and fitted with a wick in a tin tube furnishes the light, and a couple of boxes, which might be classed as furniture serve, one to hold articles of food, and the other to hold the few garments that the family needs. A piece of twine from wall to wall serves as an extra wardrobe. The dress of the women consists of a sari, a piece of cloth 8 yards long and about 4 feet wide which they wind about the body in graceful folds completely covering it in case of need. Their other garment is a choli, or short-sleeved jacket, covering the upper part of the body. The choli is sometimes embroidered with peculiar taste, and on holidays the addition of bangles and necklaces of glass beads, or pecious metals, and a nose-ring, complete a dress that is at once beautiful and useful, and is never disturbed by fashionable changes. The male costume consists of a dhoty or loin cloth, a waistcoat, and a skull cap, or turban. The waistcoat may be made of colored cloth. Long before dawn the mill hand leaves his bed either from force of habit or at the summons of a factory bell or whistle, and after a hasty toilet starts for the mill. His wife who has been up long before him is just concluding her preparation of the day's food which she carries to the mill, arriving an hour later according to the rules for women and children. Having slipped his metal ticket of presence

into the box, he walks in a leisurely manner to his post undisturbed by the fact that the engine is moving and before commencing his day's duty he dons a dirty, greasy waistcoat and cap that have been hidden in a waste can. At nine o'clock he has his first meal, while his neighbor looks after his work. The food consists of rice, dal, fish, and some vegetables cooked with hot chillies, and while he eats none but his own caste-fellows must approach or touch him. The meal over he proceeds to wash the vessels and his hands, for fingers serve as fork and spoon to the coolie. At noon there is an interval of half-an-hour during which he will sleep or lounge about the sweetmeat dealer at the gate, of whom he buys luxuries that do not always agree with him. A second ticket of presence has now to be deposited, and he returns to his work as the engine is again moving. In some mills the interval is curtailed through the cupidity of the proprietors, but the coolie by dint of frequent short absences from work is more than quits with his employers ere the day is done. Ten per cent. of the day is wasted in skulking either out of doors or in idle gossip, and the appearance of an over-looker is carefully watched and signalled round the mill.

A barber is a recognised part of the establishment; he officiates in a small corner or shed in the compound and trades on a commission basis. All the head is operated on except the moustache and a tuft on the crown. This is done during working hours, and the half-dozen men who await their turn provide lively conversation to while away the time during which the shaver exercises his art. The shavee is meanwhile admiring himself intently in a hand mirror. Such irregularities would be allowed nowhere else, but no one has been strong enough in India to stop them. There is one thing to be said in their favor. No systematic ventilation exists in Indian mills. In hot, dry weather all windows are closed, and the organic vapor from the bodies of the very numerous hands fouls the mill atmosphere and renders close attention to work impossible; a short change, therefore in the barber's shed is most agreeable. The Indian mill must be properly ventilated before discipline can be enforced.

The engine runs as long as there is daylight, and sometimes a little longer than it is possible to work efficiently. This period of the long Indian day is of very doubtful value to the proprietor, who, as a rule, does not "light up." The nominal working day is 13 hours long with half-an-hour's recess, but the actual average day's work does not exceed 11½ hours in the long days, and 10½ hours in the short ones, or an average of eleven hours. The female hands only work in the reeling and winding rooms; their average day is 9 hours and their appearance indicates better feeding than that of their sisters in the fields. They are very independent and prompt to take offence. A woman with a very young child is allowed to leave the mill at certain hours to attend to it. The moral tone of the mill coolie can only be fairly compared with that of the rest of his class. He is an incorrigible, although a clumsy, liar, and when questioned he instinctively attempts to prevaricate or deceive—a relic of the days when life and property were never safe. His amusements are gregarious and noisy, and his taste for holidays insatiable. The funeral of his father or mother may serve half-a-dozen times as an excuse for leave unless it is observed by his immediate superior. Every new employment is bought by a bribe to the muccadum, and the active presence of an inspector at the gate of issue at choosing time is justified by the pilfering instincts of the men. Pay-day is a period of mingled joy and apprehension to the mill coolie, for he knows, if he has been extravagant, that a familar face is waiting at the mill gate to recover instalments of interest on loans that have been contracted at rates for interest which may run up to 30 per cent. per annum. One-third of the month's pay is often sacrificed in this manner, and the debt is hereditary. There are no trade unions

in India, because there is no social organization that could collect and hold money for such a purpose. Nevertheless, the Indian mill hands know how to strike, and even to riot in formidable numbers. Their savings (when they do save) go to the family plot of land or are invested in jewellery which may at any time be converted into cash at a slight loss. Many were therefore able to find a retreat when the exodus due to plague took place last year. Those who remained received a very great increase of wages and daily pay which they managed to keep up by partial strikes in spite of the efforts of their employers, long after the necessity was past. Wages are still abnormally high in Bombay, and nothing but the difficulties of migration due to quarantine, keep the mill hands together at the present time. Higher wages do not have the same effect on the operative here as in Europe. The standard of living among coolies remains the same, although when money is plentiful they will squander it in vice or luxury or temporary gratification, if they do not hoard it. They are thus always able to live on the very smallest means and to dispense, if need be, with a roof, for a great part of the year. The complete separation of the mill coolie from agriculture seems to be a necessary condition of the success of cotton manufacture, and a higher standard of living, with more numerous necessities, appears to be the only influence likely to steady him. —Indian Textile Journal.

Fire Proof Buildings.

Edward Atkinson, in a recent communication to the American Architect, on fire-proof buildings, refers to a recent complete destruction by fire of the contents of two protected or encased steel-frame buildings, one in Pittsburg and one in Detroit, to which regard should be given as to the very great dangers that are now and will continue to be incurred in the so-called "sky-scrapers," sometimes called "fire-proof" buildings. He remarks with some misgivings concerning many buildings which are now being constructed in the principal cities of this country, where the steel frame is covered only with a thin veneer of non-combustible material, which will in time be peeled off under the heat even of a moderate quantity of combustible contents. In the opinion of Mr. Atkinson, however, it looks quite useless to attempt to stop the construction of these buildings of very many stories. These comments are as applicable to buildings used for factory purposes; as to the high buildings of our cities, as noted in the occurrence of a fire that destroyed a large spinning mill at Burnley, England, which was constructed upon the principles here noted. An account of this Burnley fire is given in a report of experts who were called upon to examine into its causes. By this report, it appears that a fire broke out in the so-called fireproof mill, which, at the time, was being worked as an ordinary cotton-spinning factory, by the New Hall Spinning Co., Burnley, with the result that within two and a half hours from the outbreak the whole place was a perfect wreck, notwithstanding the structure was composed entirely of iron, brick and cement, not a particle of timber being used except the boards covering the floors, and the window-frames. This is the second mill in England within seven years—of fireproof construction—which has collapsed through the effects of internal fires.

Persian Sheep.

We are in receipt of the following communication from the U. S. Vice-Consul General stationed at the capital of Persia, which may interest a number of our readers, as furnishing corroborative information concerning the breeds of sheep in the western part of Asia.

Editor Textile World:

There are at the present time practically but two breeds of sheep in this country, those that have large fat tails of the same breed as those of the Tar-

tar regions, and that comprising sheep with the thin, long ordinary tails. The latter, so far as my observations have gone, are mostly found in the forest districts or where grass is plentiful; and the others on dry open plains, where grazing is scant and dry. These conditions are probably the cause of the natural distinction and differences in the breeds. Where grass is plentiful and procurable at all times and seasons of the year, the tail of the sheep is small, but where the grazing grounds are arid and scorching the tail is large, sometimes of enormous size, and is doubtless a reservoir of nourishment to support growth and health. The sheep of either kind are of various sizes, by the processes of natural selection, and nothing whatever is done to improve the size of the animal or the quality of the wool. The Persian sheep farmers, who mostly belong to the Nomad or Gypsy tribes, of all peoples are perhaps the least enterprising.

There is but little difference in the quality of the wool of the different breeds, though I should say from what I have seen of them that the long tailed sheep furnish the best. The staple of both is rather long, but is more or less coarse. For the manufacture of the finer woolen textiles the under or downy part of the wool is separated from the other. The imitation cashmere shawls and the more costly rugs are made from this.

In order to improve the quality of the shawls, and with the intention of competing on equal terms with the cashmere manufacturers, some of the cashmere sheep were imported into Persia with the object of having a distinct breed, but the influences of the climate were unfavorable and degeneration quickly set in, so that at the present time all the original specialities have disappeared and now there is no apparent difference.

I hardly think that there can be any admixture of the Merino blood with the Persian breeds. I have seen nothing which would lead me to form such an opinion.

There has been for some years past a considerable export of lambskins, indeed to such an extent that it has interfered largely with the mutton supply. The lambs have been killed, for the sake of their skins long before the meat was fit for food, consequently the flocks have been disastrously reduced. These skins are sent to Russia and from there after undergoing some polishing process are sent westward as the well-known article called "Astrakhan." The Persian government has now issued orders prohibiting the export of the skins on account of the scarcity and dearness of meat which have been brought about thereby.

The shearing of the sheep is performed by ordinary scissors and is, as can be imagined, a rather slow process.

JOHN TYLER.
Vice-Consul General.

Teheran, Persia, Feb. 23, 1898.

Wool Market.

There is absolutely little or nothing to say concerning the wool market for the last month. It has been in a state of absolute inactivity, with scarcely any wool being sold, as manufacturers are disinclined to pay present prices, and, furthermore, prefer to work up their present supply more closely to their wants. In fact, manufacturers are hardly in a position to know what their future wants will be, as they are without orders enough to operate their machinery many weeks more. Many mills will be obliged to stop, as many have already curtailed, unless orders come in more freely than they have of late. In some lines of woolens, however, there is a measure of activity, due to the demand for army clothing, but, in this respect, the expectation is that cotton mills will receive more of the benefits arising from the demand for this kind of clothing than woolen mills. There will, undoubtedly, be a large placement of orders for army blankets. Dealers, however, seem to be viewing the situation with a degree of complacency, and are not disposed to shade prices materially, though the latter are not supported, as

formerly, by an advancing foreign market. Territory wools are receiving most attention, due to the fact, largely, of their being in greater supply and cheaper per scoured pound. Territory wools show a shrinkage in price, per scoured pound, of about ten cents from the highest price received six months ago. Ohio XXX is quoted at 32 to 33 cents a pound, and Michigan X and above at 23 cents. Port Phillip combing commands 70 to 72 cents for 70's, and the clothing 64 to 65 cents for 60's.

Cotton Market.

The price of middling uplands, at the present writing, is 6 7/16 cents, against 6 1/16 cents last month. The improvement in the price of cotton, in the face of the heavy receipts, is due to speculation on the part of foreign operators and spinners, because of possible trouble in receiving a sufficient supply, which the interference with commerce that the war between the United States and Spain may occasion. In this connection, it may be well to remark that during the war between the United States and Spain, exporters, as long as their cotton is shipped under a neutral flag, need not fear confiscation, for in 1854 England, France, Russia, Prussia, and Italy all agreed that an enemy's goods should always be safe in a neutral vessel. Spain and the United States did not sign this agreement, as did the other nations mentioned, but it is pointed out that Spain, by treaties with the United States in 1795 and 1819, agreed not only that neither of them would seize the other's goods, in case of war, on board a neutral vessel, but also that they would not seize the goods of any power at war with them on board a neutral vessel if the government of this neutral vessel had acknowledged the principle that free ships make free goods, or, in other words, that the flag covers the cargo. England and France have both acknowledged this principle, and, consequently, American goods on the vessels of either of those nations would be safe from Spanish capture. Spain could do possibly great harm, at least for a time, to the coastwise trade of America, but would be powerless to injure its foreign trade. Therefore, cotton exports should not be stopped by a war with Spain.

The prospects now are that a large area will be planted throughout the South this year, with a free use of fertilizers, which would indicate another large crop, fully equal to that of last year. The tendency of this must be toward lowering the price for the material, which would be manifest, no doubt, were it not for the present speculation on the part of foreign buyers. We are almost absolutely sure to have over eleven million bales for the crop of 1897-98. Already there has been received nearly 10,500,000 bales, and it is safe to count upon at least one-half a million more bales before the first of September. The takings of Northern and Southern spinners have been in about the same proportion to the full crop as last year; that is to say, up to the present time, the spinners of this country have taken about 28 per cent. of the perspective crop, against 27 per cent. of the crop of 1896-97.

—The date of the discovery of Tyrian Purple is uncertain, but Pliny, who describes and many times makes reference to it, gives the approximate time as 1400 B. C., "when Minos reigned in Crete." The use of wool dyed with it was strictly confined, under penalty of death, to members of the Imperial family.

—Up to about 1850 superiority was the guiding principle of the manufacturers, whose study it was to excel. Today their position seems reversed, and inferiority rules, and we seem to study how far we can deteriorate our goods, whilst maintaining an outward appearance of quality.

—The delivery of the modern condenser is to lay the fibres straight, side by side.

#23190#
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COTTON DEPARTMENT.

American Cotton Spinning Machinery.

CHARLES CLIFTON HEDRICK.

ARTICLE II.

(Copyright.)

When the breaker picker is located some distance from the opener and is connected by a trunk, as in Figure 1 while the cotton is being drawn along the trunk, which is, of course, only for a short time, but, in order to insure the laps being free from any irregularities in weight from such cause, the receiving end of the breaker is provided with a condenser and guage box which is shown in the section of the breaker picker in Figure 6.

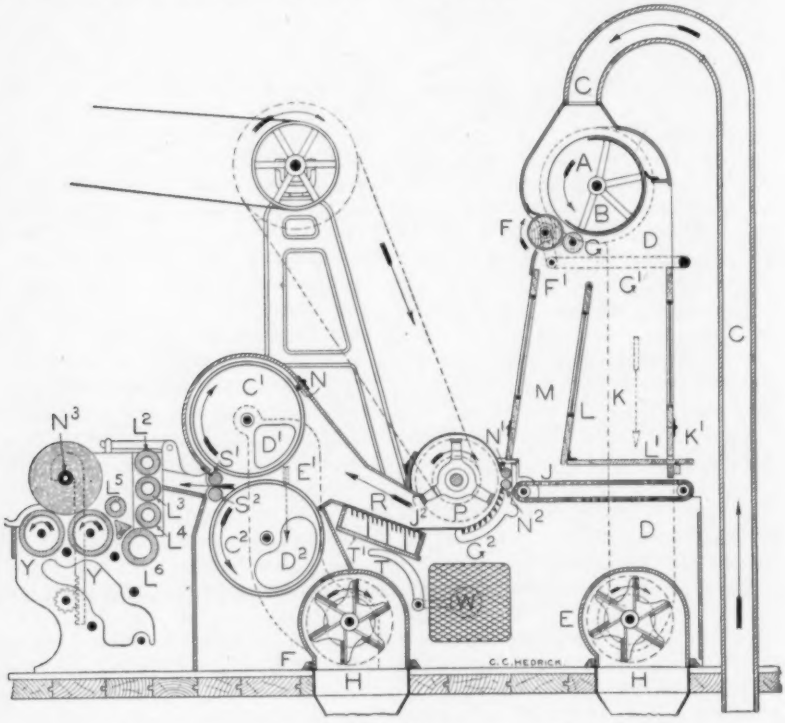


FIG. 6.

(April), there must be considerable cotton in transit between them when they are in operation, and, as the feed of the opener is usually stopped, for a brief period while doffing the breaker, it is evident that the cotton in the trunk would be drawn forward and deposited upon the apron of the breaker. This would cause a thick place to be formed in the first part of the next lap wound, followed, immediately, by a corresponding thin place,

In the top of the condenser is a revolving screen or cage "A," on the inside of which is a stationary shield, or cradle, "B," which covers a little more than one-half of its surface; the air current passes through the perforations of the cage not closed by the cradle. The cotton, which enters from the trunk "C," through the top of the condenser box, is deposited upon the open side of the cage. Each end of this cage opens directly into a dust

passage "D," shown by dotted lines, on the outside of the gauge box. The air passes out through the ends of the cage and down this dust passage to the fan "E," from which it is forced out through the pipe "H" to the dust room.

As the screen slowly revolves, the cotton, which is deposited upon its surface, is brought around between the screen and the roll "F." The cradle, at this point, covers the screen, preventing the passage of air through; the cotton is thus very readily stripped from its surface, being assisted by the rolls "G," whose surface runs in the opposite direction to the surface of the cage. The cotton passes between the rolls "F" and "G," and falls down upon the feed apron "J." It will be seen that the roll "G" is held rigidly in its bearings, but the roll "F" is supported at either end by a lever "G^1," which is centered at "F^1." The short end of this lever carries the roll while the long, being the heavier, keeps it pressed against the cage subject to the varying thickness of the cotton passing through.

The guage box is divided into front and back compartments "M" and "K", by a swinging partition "L," which regulates the amount of cotton allowed to pass forward on the feed apron. The front compartment, which receives the cotton as it falls from the condenser roll, is usually about half full, but, with the stopping of the breaker and feed of the opener the cotton is drawn out of the trunk filling this compartment, any surplus will fall over into the back compartment, which is cleaned out by opening a door at "K^1." With the starting of the breaker the cotton, that is contained in the front compartment, serves as a source of supply until the cotton comes through the trunk. By narrowing the front compartment, by the swinging partition "L," the feed may be made lighter as a smaller portion of the surface of the feed apron will be covered. The position of the partition is regulated by a pin which fits into a series of holes drilled in the underside of the board "L^1," which forms the bottom of the compartment "K."

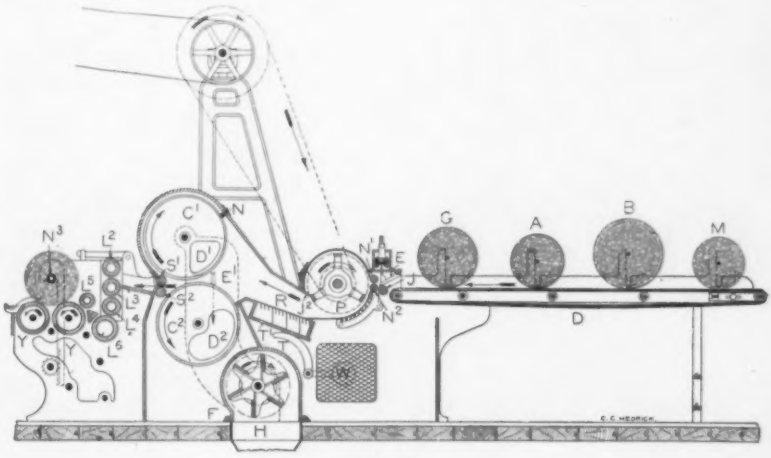


FIG. 7.

From the feed apron, the cotton is drawn between the feed rolls "N^1" and "N^2," and brought into contact with the blades of the rigid beater "P." This beater, which is constructed in the same manner as the one previously described in the opener, runs about 1200 revolutions per minute. The object of this beater is to continue the opening and cleaning process, the dirt being driven down

between the bars of the beater grid "G²," by the force of the blows it receives from the blades of the beater.

It will now be seen that a double operation is going on; the cotton is being drawn along by the air draught, while the heavy impurities are being driven through the grid against the air draught which enters from below and passes up between the bars.

The speed of the fan "F," which is about 1060 revolutions per minute, plays an important part in separating the dirt from the cotton. If the draft is not strong enough, the cotton will be driven down through the grid with

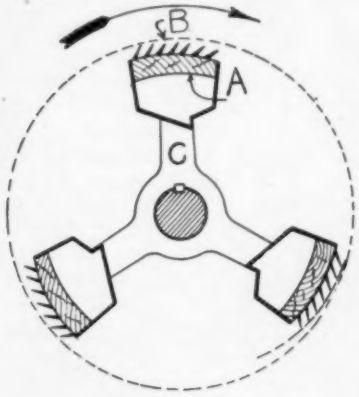


FIG. 8.

the dirt, making too much waste; while if it is too strong the dirt will be drawn along with the cotton into the lap.

The beater grid consists of a series of stationary bars which extend from side to side, and around the beater for about a quarter of a revolution. The first bar, under the bottom feed roll, is set about three-eights of an inch from the circle described by the beater blade, while the last bar is set about one and one-fourth inches away. The grid bars are supported by brackets which are adjustable and are bolted to the frame. The space between these bars is graduated, those nearest the feed roll having the widest space between them, as the greater part of the dirt is removed before the cotton passes to the last of the series.

The cotton is now under the influence of the fan draft, by which it is drawn forward over the inclined grate bars "R," and is collected upon the revolving cages "C'" and "C²." The strip "N," which is faced with leather, prevents it from collecting above this point on the top cage. As the cotton passes over the inclined grate bars the dust and dirt which are shaken out of it settle down between them into the box "T¹." A dead air space is formed by every fourth bar extending to the bottom of the box, thus preventing the dirt from being drawn back into the cotton. The bottom of the box is kept up in position by the lever "T" and the weight "W," as shown by dotted lines on the outside of the picker. When it is necessary to clean out the box, the weight is raised, allowing the bottom, which is hinged at one side, to swing down.

The stripping plate "J²," by reason of being set close to the beater, prevents the cotton from following around with the air current, caused by the beater. The air draft passes out at both ends of the cages, through the openings "D'" and "D²," and down the dust passage "E'" (represented by dotted lines), to the fan "F." From this point the air is forced out through the pipe "H" in to the dust room. The cages thus form a screen, which assists in cleaning the cotton, the fine particles of dust and lint passing through the perforations with the air draft. The openings "D'" and "D²" can be closed by dampers when it is desired to throw the draft all on one side of the cages, as the lap sometimes becomes thin on one edge. The perforations, or meshes, in the top cage are generally made larger than those in the bottom cage, thus allowing a greater passage of air through the top cage, and, consequently, a thicker sheet of cotton is formed. If the cotton is deposited equally on each cage, although formed into one sheet by passing between, there is a tendency to separate, or split, when unrolled behind the finisher picker or card, but as the sheet from the top

cage forms the inside face of the lap this trouble is overcome in a measure.

Another method for preventing the splitting of the laps, and which is in use by some builders of machinery, is to have the top cage considerably larger in diameter than the bottom one. By this means the exposed surface of the top cage is made larger and a thicker sheet of cotton is formed. When one cage is used, in the formation of a sheet, the laps are not so liable to split, as there is only one surafce upon which the cotton is deposited.

From the cages, the cotton is stripped off by the stripping rolls "S^{1}" and "S^{2}," and drawn between the calender rolls "L^{2}," "L^{3}," "L^{4}" and "L^{6}," which are heavily weighted, and, being

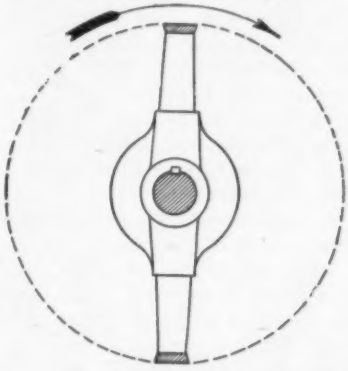


FIG. 9.

slightly different in diameter the faces of the lap are smoothed or ironed out, which also tends to prevent the laps from splitting. After leaving the calender rolls the cotton passes forward under the press roll "L^{5}," and is wound on the lap roll "N^{3}." This lap roll is held down by friction and rests upon two fluted rolls, "Y," called lap calender rolls, which revolve and cause the lap roll to wind on the sheet of cotton as it comes from the calender rolls. The lap is thus wound very compactly and firmly.

Leaving the breaker picker, the cotton passes through the intermediate and finisher pickers. The principle of these two machines, so far as the opening and cleaning is concerned, is the same as in the breaker picker, with the addition of an evener and a long feed apron. The design is also practically the same, differing only in mechanical construction.

When the double carding system was used almost wholly, not so much attention was given to the weight of the picker laps, but with the increasing tendency towards spinning finer yarns and the general introduction of the revolving flat card, it became necessary to produce picker laps of a more uniform size and weight. This led to the adoption of single beater pickers instead of using two or three beater machines as formerly.

The first operation of doubling is placing four laps upon the apron of the intermediate picker, so that the thin or light places will be distributed over its surface. If the laps from the breaker are unrolled and held to the light, there will be seen thick and thin places, and, as the thin places are not always in the same portion of the lap, by placing one lap over another we get a more even sheet but one four times as thick.

A section of an intermediate picker is given in Figure 7. The laps "M," "B," "A," and "G," which have been formed on the breaker picker, rest upon the feed apron "D," by which they are unrolled. It is advisable that they be of different diameters, so that a continuous sheet, four laps thick, may pass through the feed rolls. If the laps are all of the same diameter, or nearly so, there is a possibility of two or more running out at once, and, during the time required to replace them, a break is liable to occur in the continuity of the four thicknesses, but with the laps of different diameters, the replacement of one, which can be very quickly performed, makes a break in the doubled laps well nigh impossible. The laps are carried forward on the feed apron and are drawn between the evener roll "J," and the sectional plates "E," then between the feed rolls "N^{1}" and "N^{2}." From this point the coton is treated in exactly the same manner as in the breaker.

The letters of reference are the same on the sections of both machines.

The cotton, when taken from the intermediate picker, goes through the third process, that of the finisher picker. It is here treated the same as in the previous machine, the only difference in the two machines being the carding beater which is generally used in the finisher. Of the different styles of pin beaters, which have been used, from time to time, the carding beater gives the best results.

A section of this beater is shown in Figure 8. It will be seen that it consists of three wooden lags, "A," securely fastened to the arms, "C," of the beater shaft. From these lags project steel pins, "B," arranged spirally, each row being farther from the center than the row preceding it. This

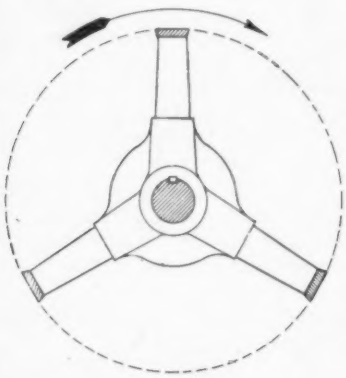


FIG. 10.

beater combines the carding and beating action, the pins penetrating the tufts of cotton, thoroughly separating and dividing them. The cotton is thus deposited on the cages in a finer and more even sheet, and the work of the card is slightly lessened. Notwithstanding the claim made by many to the contrary, the carding beater is capable of removing more dirt and leaf than the rigid beater.

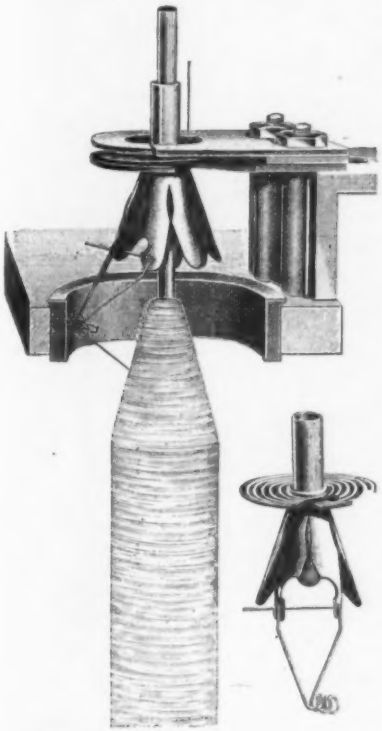
Figures 9 and 10 show sections of two and three bladed rigid beaters. In comparing these two beaters, it will be seen, readily, that the two bladed one must be run at a higher speed to get the same number of blows per minute than the three bladed beater, and, while some object to the high speed necessary, it is certainly cheaper to construct. Opinions are divided in regard to the respective merits of these beaters. At the present time the three bladed one is most preferred. Some of the rigid beaters are made with the edges of the blades of hardened steel, but these do not wear any better than the ordinary blades, becoming dulled about as soon and cannot be sharpened without grinding which is considerable trouble, while the ordinary blades may be sharpened by planing off the dulled edges.

Spinning on the Bare Spindle.

Spinning on the bare spindle in the frame has taxed the inventive ingenuity of man for a number of years, without attaining any commercial success towards the desired goal. Some of the efforts have been exhibited in this country, and, when under the control of experts, gave promise of much success, but when placed in factories to be operated by ordinary help, they proved dismal failures. Nothing has yet been sucessfully attained on a commercial scale. Whether the solution has been achieved or not is a question. Some of our English advices seem to think that a recent invention by one P. P. Craven, has solved the problem. At any rate, it is regarded as the most successful attempt thus far of spinning cotton on the bare spindle, continuously. Intermittent spinning, such as is performed by the mule, of course, can be accomplished upon the bare spindle. The patent device that is attached to the frame for this purpose is illustrated herewith.

According to a description given in a Manchester exchange, the roving is delivered from the rollers at a uniform rate of speed, as in the ordinary ring frame, with the spindles running at a constant speed of 7500 revolutions per minute. The spindle is only just sufficiently tapered to enable the cops to be pulled off without trouble. In

other respects, there is no difference between it and the ordinary ring spindle. The ring rails are operated some what differently to those of a ring spinning frame, since each rises and falls alternately with the other, and, as both are worked from the same motion, they not only serve to balance each other, and thereby require but little power to operate them, but they rise and fall at the same rate of speed.



SPINNING ON BARE SPINDLE.

The traveller, as will be observed in the illustration, is composed of four distinct parts, consisting of a central tube which passes over the spindle, and the hole in which is just large enough to enable the tube to rise and fall easily on the spindle and without any danger of locking; a conical bonnet; a wire thread guide, or traveller proper, hinged to the latter, and a slotted disc by means of which the whole is supported. The tube, bonnet, and disc, when assembled together, form one solid piece, as it were, and the only part capable of altering its relation to the others is the wire thread guide.

The roving is passed from the roller direct to a slit in the flange of the traveller, to which it enters by way of a slit in the steel supporting plates, thence partially round the bonnet beneath the plates, over the crossbar of the wire portion of the traveller, thence to the curl in the free end of the wire, and so to the spindle, which may either be pasted or have a short cop tube placed on it. The wire portion of the traveller is limited in its outward movement by the diameter of the ring only, and in its movement towards the centre of the spindle by the latter or the yarn which is built upon it.

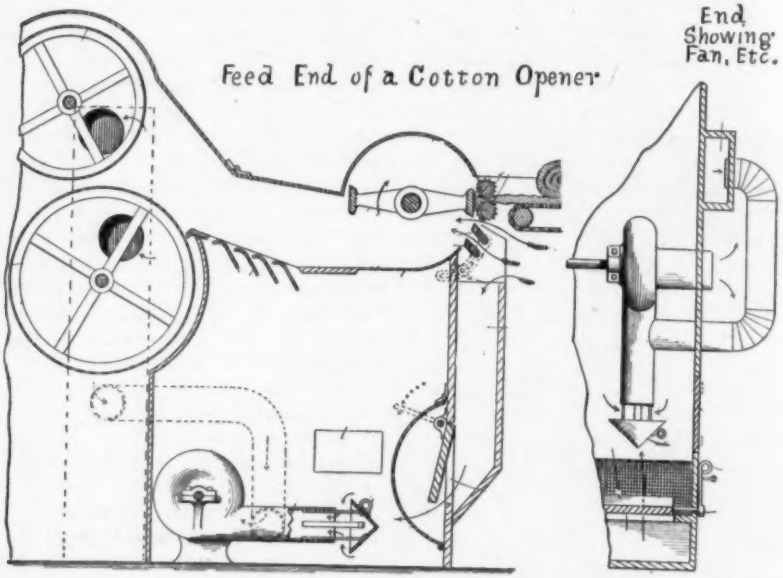
The object of the complete arrangement it to allow the wire to have free motion inwards towards the spindle, and outwards towards the ring, so that the tension or drag of the yarn may remain practically constant, whether the yarn is being wound on to a small or large diameter—that is to say, that as the diameter which the yarn is being wound upon decreases, the traveller, or the point through which such thread passes or round which such thread is wound, is moved inwards towards the centre of the spindle, and as that diameter increases, the traveller is moved outwards away from the centre of the spindle. By these means the angle at which the yarn draws the traveller with reference to the circumference of the ring remains practically constant within certain limits, whatever be the diameter on which the yarn is being wound.

This arrangement is especially advantageous when starting a set when the speed of the spindles is low, as it relieves the yarn of injurious tension; but when the full speed is attained centrifugal force comes into play and takes the lower end of the wire against the ring, as shown in the illustration, and thus sets up drag, in addition to that due to the contact of the disc with the steel plates. The whole

of the traveller is very light, and for different counts fresh wires can be readily inserted in the bonnets.

At first sight the arrangement appears to be somewhat cumbrous, and as if it would be difficult to piece up ends. On these points the inventor admits that it is not so simple as in ordinary ring spinning, but the difference in time in piecing up on the new frame compared with a ring frame is very slight indeed, according to experience.

The frame thus equipped is said to spin all counts up to 40s satisfactorily, and at a rate of production averaging 25 per cent. greater than the mule. Above 40s the rate of production compared with the mule is said to be still higher, but not in the same ratio as below 40s, though in no case it is said, is it lower than the mule.



Cotton Opener.

There has recently been invented, by a resident of Chicopee, Mass., some improvements in cotton openers or beaters, which we illustrate herewith. The particular point of improvement in such machines is at the feed end, where the impurities of the fibre are removed. The improvements that have been made are adapted to the removal, or are so intended, of the very minute pieces of seed-hulls and similar substances, which have but little weight and the extraction of which has also been difficult of accomplishment.

Referring our readers to the illustration, we will say that the adjustable bars located under the feed rolls, are so placed that their sharpened edges lie in close proximity to the feed-rolls, to the end that by the rotation of the beater arms the cotton fibre as it is delivered from between the rolls is struck by the rapidly-rotating arms and finely separated and carried by the arms across the edges of the adjustable bars, which are so adjusted that their operative edges are turned up at a suitable angle to receive the cotton fibre torn from the mass of fibre fed into the machine. The impact of the beater-arms against the cotton coming from the feed-rolls and the whipping out of the fibre against the edges of the bars, beat out of it all of the heavier impurities and drives them out through the bars.

A screen forms the bottom part of

the enclosing case of the beater-arms, and through this is drawn the greater part of the finer impurities remaining in the cotton which has been carried by the beater arms across the edges of the adjustable bars. A passage is provided between the beater-cylinder and the two exhause-cylinders, and, if desired, a part of the bottom of the passage-way may be formed of a series of slats, constituting a "grating," so called. This grating, however, is not essential to the proper operation of the improvements.

The machine having been set in motion, its operation is as follows: As the cotton begins to pass through the feed-rolls and is caught by the rotation of the beater arms between the latter and the edges of the adjustable bars, the coarser impurities held in the fibre are beaten out of it and forced out through the bars, the air having been more or less exhausted from the central compartment by the rotation of the fan at the bottom of the machine. Now the proper operation of the machine, whereby the maximum quantity of the impurities contained in the cotton is removed with the loss of the minimum amount of fibre, depends upon the proper regulation of the air currents entering the machine and upon means for regulating the relative degree of vacuum to be maintained in the cylinders which receive the cotton and the central compartment and the beater-cylinder.

When the machine is well under way, the operator by examining the product and the waste of the machine can determine at a glance whether or not the action of the air upon the fibre is such as to insure the best results. If too much loose fibre is found with the waste behind the screen in the bottom of the machine, it indicates that not enough air is passing through the bars, and by closing the door, more or less, the air will pass through the bars in proportion as it is excluded from the vertical conduit. If it is found that the finer impurities do not pass down through the screen in the beater-case in proper quantities, by manipulating the cap on the end of the exhaust-pipe of the fan to increase the area of the opening of the latter an additional part of the air-current entering through the bars will be diverted downward through the screen, carrying with it the light particles of seed-hulls, etc., which form the larger part of the impurities at this point. It frequently happens, owing to atmospheric or peculiar conditions of the fibre, that a lesser degree of exhaust is required on the cylinders than at other times. When this occurs, the defect is remedied by reducing the exhaust action of the fan on those cylinders by a further opening of the end of the pipe of the fan, and if this operation causes too strong a current downward through the screen this can be offset by slightly increasing the opening of the bottom door. It would seem that by means of these improvements a cotton-opener or similar machine can be adapted to any condition of atmosphere or quality of fibre and while the machine is in operation.

Cotton Picking Machine.

The successful and mechanical cotton picking machine is still, apparently, in the future. Whether any of the recent inventions will result in any adoption of this method of picking cotton, remains to be seen. A new machine of this kind has recently been invented by a party residing in New York City, in which electricity is a conspicuous feature. Machines for this purpose have been open to the objections that they gather leaves and unripe cotton along with the ripe cotton. In such machines, this has been largely obviated by shaking or knocking the plants and collecting what is thus detached by suitable mechanism, generally a pneumatic suction device. This new machine dispenses with any necessity for shaking the plants, while attaining the result of only collecting what is readily detached, by the use of an electrified collector, charged by an independant source of high tension electricity.

—One of the new cotton bales now being urged upon ginners as the proper thing for all concerned was exhibited in the corridors of the Galveston, Texas, Cotton Exchange recently. With the exception of the bagging, it is reported the bale was about all that could reasonably be desired. It was ginned in the standard box, 24x54 inches. This size let the entire bale under the compress, and the compressed bale came out 57 inches long, 27 inches wide and 15 inches thick. The density, which was secured with the ordinary pressure was 41 pounds to the cubic foot. The bale weighed 542 pounds and measured 13.27 cubic feet. The bale had eight bands. The density was one of the remarkable features about it. The required density for shipping is 23 pounds to the cubic foot, but this bale was 41 pounds, and was secured, it is said, with the same pressure. It was compressed at the National Compress at Waco and was consigned to Richard Lord.

Cotton Manufacturing in Massachusetts.

At a recent hearing before the committee on labor of the Massachusetts legislature, some interesting facts were brought out, which may be well worth recording. In the testimony of W. S. Southworth, agent of the Massachusetts Mills, Lowell, it is noted that these mills have been negotiating a contract to produce goods for the Chinese trade, to be made at its Georgia mill, at a price which would just cover the cost of manufacture in Lowell. In regard to the wages in the Georgia mill, he said that they were thirty per cent. less that in the Northern mill, i. e., the price per hour. On the piece price, the difference varies from 28 to 42 per cent. The raw material costs from one-half to three-fourths of a cent less, due mainly to the saving on freight. It is well to note this latter point, that freight is considered a most important factor. Mr. Southworth reasoned:

"The product of the Massachusetts mills in Lowell is using 18,000,000 pounds per year, so that difference would mean $180,000 per year saving on the product, or 10 per cent. on the capital. The saving at the Georgia mills is $70,000 on its 7,000,000 pounds product. Then a great deal of this product goes to China via Vancouver, and the freight is $1 a bale less from Lindale to Vancouver than from Lowell."

Another important item was touched upon by Mr. Southworth, when he said that there was no special objection to the Massachusetts system of taxation, the trouble being mostly from threats of future legislation. This may be rather interesting reading, when compared with some of the allegations made in the recent memorial of cotton manufacturers to the legislature.

In addition to the fact that the overtime work gives the South an advantage, Mr. Southworth said coal costs $1.45 in the engine room of the southern mill and $3.85 in the Lowell mill, while freight to China was $1 a bale cheaper from Georgia.

Mr. Southworth described conditions at Lindale, Floyd County, the Massachusetts mill village. He said it was a cotton plantation the year before ground was broken. A mill, school, churches, and five and six-room houses were built. The corporation collects 25 cents a week for room rent, or $1 for a four-room house. It pays most of the expense of the school, the county paying the rest. The corporation pays $2300 to support the church.

—No child under the age of fourteen years shall be permitted to clean any part of the machinery in a factory when such part is in motion by the aid of steam, water or any other mechanical power, or to clean any part of such machinery which is in dangerous proximity to such moving part.—Mass. Statute.

—The felting property of wool has much influence on its usefulness, and determines to a large extent what purposes and goods it will suit.

—The expression "woman" means a woman of eighteen years of age and upwards.—Mass. Statute.

WOOLEN DEPARTMENT.

Science and Practice of the Construction of Woven Textures.

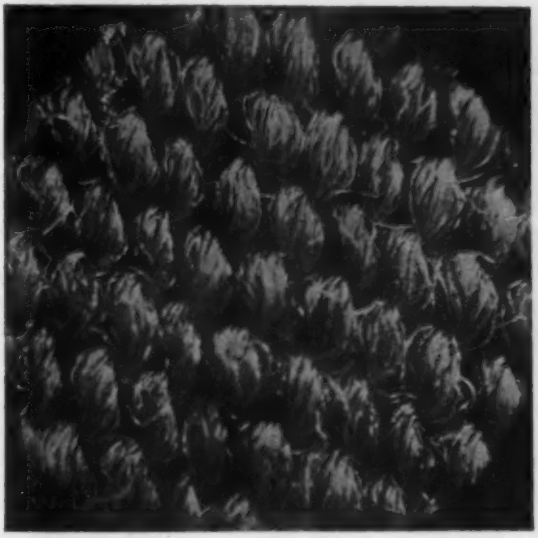
FRED BRADBURY.

(Continued from April.)

A misprint occurred in this series of articles in the March issue, page 65, second paragraph, thirteenth line. The paragraph should have read as is printed below, the words in parentheses having been omitted.

A cross section through the warp and weft is shown respectively at "A" and "B," Fig. 16, before compression takes place, and similarly at "A" and "B," Fig. 17, after the fabric is finished and where the weft yarn is seen to be compressed. For convenience we shall speak of the increase of the diameter of the weft (in the direction "a b" or) "a′ b′," Figs. 16 and 17, respectively, as an increase in the diameter of the weft in the direction of the warp, and a decrease in the diameter of the weft across "c d" or "c′ d′," as a decrease in the diameter of the weft at right angles to the warp.

A reference to the reasoning and illustrations, Figs. 14 to 19 in the February, March and April issues, makes it obvious that any increase in the diameter of the weft, in the direction of the warp, due to pressure in the finishing operations, necessarily involves a decrease in the thickness of the weft at right angles to the increased diameter, or at right angles to the warp length. These changed conditions of thickness of the filling material may be very readily determined by the application of the following formulæ, which are reductions into simple forms of the reasonings already given.



UNION COATING FIG 20. 15 × FIG 21

Formula V. Applies to the method of determining the increased diameter of the weft due to compression and is as follows: Original diameter + amount of increase due to compression = diameter of weft in the direction of the warp (i. e., a′ b′, Figs. 15 and 17).

Formula VI. Applies to the decrease in the diameter of the weft in the direction at right angles to the

warp due to compression thus: Original diameter squared ÷ diameter of weft in the direction of the warp = decreased diameter of the weft at right angles to the warp (i. e., c' d' Figs. 15 and 17).

The truth of these formulæ is made manifest by the following example. Assume original diameter of thread to equal unity — the increase in the diameter due to compression to eqpal one-half the original diameter, i. e., $1 + 1/2 = 3/2$.

Let x = the diameter of the decreased section of thread. $\pi = 22/7$, and r = radius. Then since area of cross section of thread $= \pi r^2$ (Equation 1), also area of cross section of thread $= \pi/4$ circumscribing rectangle $= \pi/4 \times 3/2 \times x$ (Equation 2); therefore equation 1 = equation 2; and $\pi/1 \times 1/2 \times 1/2 = \pi/4 \times 3/2 \times x/1$; $3x = 2$; and $x = 2/3$. Or by formula V., $1 + 1/2 = 3/2$, increased diameter; and by formula VI., $(1 \times 1) \div 3/2 = 2/3$, decreased diameter.

The result obtained for threads of warp per inch in cloths constructed, as in Fig. 18, in which the warp is straight and the weft produces an angle of 30° may be readily determined if the reasoning connected therewith be reduced to the following simple formula.

In Fig. 18, the perpendicular distance "m n" is shown to always be equal to one diameter of weft + one diameter of warp. The relation of the base to the perpendicular is, of course, trigonometrically, always a fixed ratio for the same angle. This ratio may be found as follows:

Hypothesis = Angle of 30°.

Perpendicular "m n" = unity.

Let base = "x."

Then tangent of angle 30° $= 1/\sqrt{3}$ (Equation 1); also tangent = perpendicular ÷ base = "m n" ÷ "n c" = $1/x$ (Equation 2).

Therefore $1/x = 1/\sqrt{3}$; and $x = \sqrt{3} = 1.732$ = perpendicular ÷ base = 1/1.732.

Therefore the base is always 1.732 times larger than the perpendicular for tangent of the above angle.

Formula VII. Applies to those threads of warp which remain straight while the weft makes an angle of 30°. 1 diameter of warp + 1 diameter of weft × 1.732 (relative length of base) = the distance from centre to centre of the warp threads at the place of intersection with the weft; or 1 thread of warp + 1 intersection of weft: consequently the denominator of this fraction of an inch indicates the actual number of threads of warp per inch. Thus, by using this formula and the particulars given at Fig. 18, where the amount of compression was 1/2 — diameter of warp (2/220s cotton) = 1/276, and diameter of 1/20s mohair weft = 1/142. $1/276 + 1/142 \times 1.732 = 1.732/93 = 1/54$ of an inch (nearly), therefore threads per inch = 54, as determined previously from the reasoning, and without this formula.

But this simple formula applies only to those cloths which contain as many intersections as there are threads in one repeat of the design. The following slight modification makes its application more general.

Formula VIII. Applies to the set of threads which are perfectly straight in the finished fabric. The angle of intersection produced by the weft is one of 30°. The thickness of warp or weft may or may not be alike, also the threads of warp and the intersections of weft may be different, and is as follows: Number of intersections × 1.732 × (1 diameter of warp + 1 diameter of weft) + combined diameter of warp threads which one repeat of the design contains over and above the intersections in the same repeat ÷ the number of threads in one repeat of the weave. The result equals the average distance from the centre of one warp thread to the centre of the next. The denominator of this represents the threads of warp per inch.

Assume that there are 3 threads of warp in one repeat of the weave, and 2 intersections as in the cashmere weave. Then retaining the same particulars and conditions of warp and weft as in the example immediately

preceding, we obtain the following result, by formula VIII:

$[2 \times 1.732 \times (1/276 + 1/142) + 1/276] \div 3 = [(3464 \div 93{,}000) + 1/276] \div 3 = 3464 + 327 \div 3 \div 93{,}000 = 38/930 \div 3 = 38/2790 = 1/74$ nearly, or 74 threads per inch.

Consequently, formula VIII is shown to be more general in its application, but for fabrics in which the number of intersections of weft with warp are the same in one repeat of the weave. Formula VII is equally applicable and better because it is slightly less involved than formula VIII. A judicious application of the formula given will enable the manufacturer to satisfactorily construct not only any of the cloths which we have previously considered, but various other systems of woven textures yet to be entertained.

Union coatings are produced chiefly to meet a demand for a comparatively cheap kind of light weight coating, but at the same time they must possess the appearance and characteristics of an all-woool coating. The fabrics may be made with a cotton warp and an all-wool worsted filling, or a worsted warp and cotton weft. The former method is more frequently adopted being more economical. The latter yields a better result, yet scarcely in the same ratio as the increase of cost, hence the more general adoption of the first method, which we purposely choose to consider first. The cotton material should be first dyed, for finishing, to a shade which is similar to the mixture shade of wool intended to be subsequently employed in conjunction with the cotton to produce the required fabric.

If the texture has to be a solid color, then the cotton material whether for warp or weft must also be first dyed to the nearest or approximate shade of color of the texture required.

One color of warp frequently serves for several colors of weft, e. g., one shade of fawn or brown may be made to serve for several shades of fawn or brown in the same scale of color. Obviously then several pieces of differing shades may be produced from one warp, which means a saving in respect of warping, dressing and looming or twisting-in. Consequently the ever-increasing demand for odd or few pieces of one scheme of color, can with little difficulty be satisfied in this particular.

The cotton material as already mentioned may be dyed for either subsequent finishing, or for subsequent dyeing. To dye cotton warp or weft for finishing indicates that the material will afterwards be employed in the construction of a fabirc which shall be composed partly of a different material, and farther since the fabric has only to be finished it also indicates that the treatment in the processes of scouring and finishing will be of a relatively mild character. To dye cotton warps or weft for dyeing, or what may be technically expressed as cross-dyeing, implies that the first dyeing should be made fast to all acids, inasmuch as the treatment to which they will be afterwards subjected will be more severe.

During the process of weaving much care is necessary in regulating the tension upon the warp threads, which, to say should be as even as possible, may appear but the utterance of a truism. But there are very few fabrics manufactured where it is more difficult to obviate bars or stripes across the piece, which are due chiefly to irregular tension on the warp, or the letting-off the same, and to a lack of regular small and stated intervals of time for taking up the woven fabric. The following particulars are for an actual cloth; the term cloth being used in its widest sense.

Warp 2/30s cotton, 7/2 threads per inch in loom.

Width of warp in reed or sley = 67 to 68 inches.

Weft 1/36s botany (worsted counts) = 88 threads per inch.

Width of cloth finished = 54 inches.

Threads per inch of 36s worsted = $\sqrt{(36 \times 560 - 10\%)} = 128$; therefore diameter of 1 thread = 1/128.

Threads per inch of 2/30s cotton =

$\sqrt{(15 \times 840 - 8\%)} = 104$; therefore diameter of 1 thread = 1/104.

The number of threads per inch of warp and weft in the actual finished fabric are:

Threads of warp per inch vary from 90 to 92.

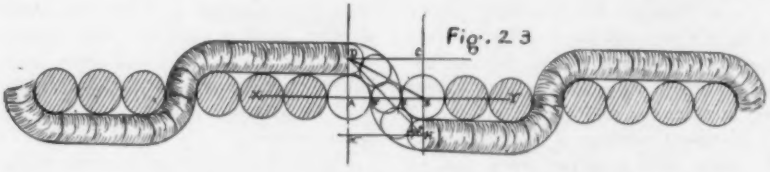
Threads of weft per inch vary from 84 to 86.

Note also in the finished fabric the warp threads are in a perfectly straight line while the weft filling performs all the bending at the places of intersection. We have previously demonstrated that when the warp remains straight and the weft performs all the bending, the number of threads per inch of warp and weft may be readily determined by the application of formulæ III and IV respectively, these formulæ being the result and embodiment of previous reasonings and conclusions. Then, by the application of formula III (see page 68 Textile World, Feb. '98) average distance from centre to centre of adjoining warp threads = $[7 \times (1/128) + 2 (1/104)] \div 7 = [(7 \times 104) + (2 \times 128)] \div (128 + 104) \div 7 = 1/84$ inch.

Therefore the number of threads per inch = 84, which reveals 6 to 8 threads less than the actual finished fabric contains, for the reasons which we shall presently explain.

Further, in accordance with the theory expounded in connection with formula IV, the number of weft threads per inch should be equal to the denominator of the diameter of the weft or bending yarn. The diameter of the weft in the present example equals 1/128, or 128 threads per inch. The actual fabric only contains 84 to 86 threads per inch, yet it would be a mistake to assert that the fabric was anything but properly constructed, to the first has become less for obvious reasons. The theory of determining these diameters was fully demonstrated, pages 69 to 70, Textile World, Feb. '98.

and that it does not produce a thoroughly satisfactory result. The reason for this apparent anomaly is not far to seek. A surface examination of the fabric, together with a cross section of the same, through the warp and separately of the material employed in the structure of the texture, by the aid of a powerful microscope are given at Figs. 20 and 21 respectively. These demonstrate very forcibly that the weft not only performs all the bending but that in the subsequent processes the weft has been subjected to compression, so that an imaginary straight line representing the diameter of the weft in the direction of the length of the warp, has increased upon the original diameter; while a second straight line drawn through the centre of the weft at right angles



The photo micrograph is further useful, inasmuch as it clearly manifests the parallelism of the fibres, which is an essential feature and characteristic in the formation of a worsted thread. A view of the cotton warp as it appears under the microscope is as nearly as possible straight. This is further evident when it is pointed out that the finished pieces are usually of the same length of warp, or thereabouts, as was used in the production of the woven fabric.

Fig. 22 is the weave plan, while Fig. 23 is a diagram representing a cross section through the warp of the first pick in the weaving plan Fig. 22.

In Fig. 23 the warp threads are shown to retain their original straight line, while the weft at the points of intersection only, is shown to be bent out of its straight course. The angle

produced by the weft at the point of intersection is shown to be one of 45°, which is the maximum for cloths constructed according to the natural limit, in which one set of threads remain straight while the other set performs all the bending. (See Fig. 11 Textile World, Nov. '97). The construction of Fig. 23 at the place of intersection is upon the same principle as in Figure 11. The same letters in each diagram refer to similar parts, for which reason it is not necessary to repeat here the method of construction.

The number of threads of warp and weft in the finished fabric has been stated to be 90 and 84 respectively. In the latter set of threads the material has been compressed from its original

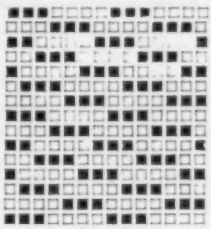


FIG. 22

diameter of 1/128 part of an inch and increased in the direction of the warp until the peripheries of each succeeding thread of weft touch their perdecessors as illustrated at Figure 20. Since there are 84 of such threads per inch, the average diameter of each thread is represented by 1/84 of an inch. If we divide this increased diameter into the square of the original diameter we necessarily obtain the diameter of the decreased cross-section of the thread. Thus by formula VI., $(1/128 \times 1/128) \div 1/84 = 84 \div (128 \times 128) = 1 \div 195 =$ the decreased diameter of the warp.

This thickness of weft it should be noted represents its thickness at the point of intersection with the warp threads. Then by the application of formula IV., which applies to the set of threads which performs all the bending and in which the angle is one of 45° as in figures 11, 11a and 23, we state $(2/195 + 7/104) \div 7 = [(2 \times 104) + (7 \times 195)] \div (104 \times 195) \div 7 = 1573 \div (104 \times 195 \times 7) = 1/90$ of an inch which equals the average distance apart of each warp thread from centre to centre; or, the number of threads of warp per inch equals 90, which is the same as the actual finished fabric contains.

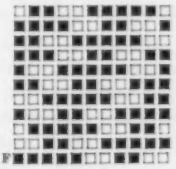
(To be continued.)

Wool Manufactures.

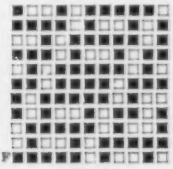
CARDED YARNS—BELGIAN YARNS—BELGIAN SYSTEM OF CARDING—WORSTED COATINGS—CORKSCREWS.

Mr. Swire Smith, Keighley, England, who is considered a good authority on textile matters, recently referred to the competition of the Belgian yarn spinners, and to the 15,000,000 lbs. of yarn they send annually to England. He and the late John Slagg, of Manchester, paid a visit to the town of Verviers, some years ago, in order to investigate personally this particular branch of competition. They were surprised with what they saw, the machinery being of the newest and most advanced types, and its adaptation most skilfully planned and arranged so as to turn out a maximum quantity of well-spun yarn at a minimum of cost. This yarn was principally spun from the "burry" wools of the River Plate—a class of wool much rejected in England on account of excess of burrs.

They considered the Belgians much in advance in this particular line, and that this competition could not be despised, but was really serious, as the



NO. 1.



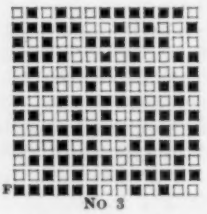
NO 2.

cost was so much less than their own yarns. There was great truth in that statement—a fact which compelled the writer to investigate the cost and system of production for him-

self, in order to combat this competition in the markets.

Finding that he could use Belgian yarns to advantage, as the cost was 15 per cent. less than English, he became a customer and a buyer.

As it is our desire to explain the advantages and disadvantages of the various systems of carding wools, we will take the Belgian system first. The wool yarns are a speciality, and made chiefly from Buenos Ayres



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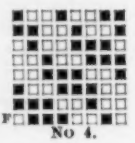


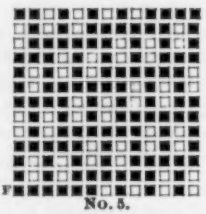
No 4.

wools, or a mixture of those wools and noils, which means the short wools from combing. Buenos Ayres wools are more infested with burrs than any other class, and in the extracting of burrs by machines the staple gets broken, so that the wool is short in staple when ready for carding. Carbonizing the burrs is the most recent process; but both processes tend to shorten the staple, which is wiry and tough compared with any of the English colonial wools.

It is to suit this special class of wool the Belgian carding system has been devised, and it has certainly been developed to a success. The counts chiefly spun are 14's, 16's, 18's, and 20's woolen counts, the 16's and 18's predominating. Many spinners limit themselves to two counts, and seldom change—a method which avoids a good deal of lost time and keeps the cards in perfect condition. A set of carding machines comprises three single-cylinder machines, with eight rollers to each, and one doffer and one swift or fancy. This is the system of Celestin Martin, the leading machinist in Verviers, who also invented the condenser (frotteur) with dividing straps or tapes. The feeds are blanket or sheet feeds between the first and second, and also between the second and third machines, but quite different to the Blamires feed, being of circular action, and requiring to be broken off in blanket form after a given number of revolutions. The short-stapled wool makes this system a necessity. The card wire is set in a vulcanite cloth, with a thick layer of "wool felt" to support the wire up to the bend of the tooth. This is equivalent to the old system of flocking cards formerly prevalent in this country, and gives a firmness and strength to the wire much greater than in English cards. As a matter of fact, the tough fibres of this wool render this strength a necessity. Another important point lies in the fact that these machines are only 48 in. wide, a width obsolete in Yorkshire, but still existing in the West of England. Where pure wool is used and spun to fine counts, and evenness of yarn is required, this width still holds good, especially in the last machine of the set.

By the aid of Martin's patent condenser with dividing straps, the delivery is ninety-six threads (and four waste threads) ready for the mule, on four spools of twenty-four threads each. From this delivery they spin direct at one draft to the small counts named. This avoids roving, and the yarns are as well spun as any to be found. The spinning mules are of English make.

Excellent though this system may be in Belgium, it has been little adopted in England. One eminent firm of machinists paid $30,000 for the



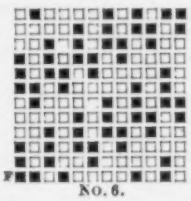
No. 5.

royalty alone of Martin's condenser, and soon sold the half share to a rival firm. Yet, so few have been sold that it is an open question how much they have lost by it.

Full time in Verviers means night and day, and with two sets of hands

working shifts of eleven hours each they turn out the maximum quantity of work. Wages are about one-third less than in England, yet Verviers is said to be a high-wage town. What with raw material of a cheap grade, excellent machinery, long hours and cheap labor, and then a free and open market in England, is it any wonder they feel this competition in the latter country. Of course, this system of carding is not suitable for shoddy and mungo, and does not suit the Yorkshire trade, where it has been tried. The yarns are largely used in Glasgow for wool shirtings, skirtings, etc.

These goods can be warped and checked in great variety, such as Figs. 3 and 4, or as may be desired. Scotch wool skirtings, woven in rep weave, are made with these yarns, and may be seen in beautiful stripes, often combined with silk, in most drapers' shops. The winceys of former days have also been displaced by these Belgian yarns, and the Angola yarn trade of the Huddersfield district has almost disappeared. It was stated by one witness from Huddersfield before the



No. 6.

Royal Commission on the depression of trade that 50 per cent. of the yarn spinners in that district had failed in seven years.

Spanish stripes, formerly a prosperous branch of trade in the Leeds district, can be made from the same yarns, and that branch has apparently been transferred to Germany. Anywhere, and almost everywhere, in cases where long hours and cheap labor form a considerable cost in woolen goods, the English meet with the same competition.

Worsted coatings have had the largest sale, and the most successful designs ever known are termed corkscrews. Being neat and stylish, they first found acceptance in the English markets, then in the American markets, and held sway for twenty years. The strike of the weavers in Huddersfield, about fifteen years ago, quickly shifted the coating trade to Bradford, and that town being depressed at the time, it was a welcome introduction. The yarns having been previously spun in Bradford, but woven in Huddersfield chiefly, the Bradford manufacturers quickly seized such an easy opportunity, and with wages 25 per cent. less than Huddersfield, concurrent with the introduction of the new fast-speed coating looms, Bradford soon took the lead in plain coatings, and the depression was shifted to Huddersfield, where slow looms and high wages had no chance against the new conditions in Bradford. Yet, with these conditions in their favor, the Bradford manufacturers have failed to wrest the fancy trade and superfine plain trade from Huddersfield.

As the fates will have it, assisted by the vagaries of changeable tariffs, the depression has again shifted to Bradford, whilst Huddersfield manufacturers are again well employed. This result has been foreseen and predicted by the initiated, as it was quite evident that Huddersfield must come to the front again with the revival of the fancy trade. As a matter of fact, Bradford has been mainly dependent on Huddersfield and Leeds all along for the dyeing and finishing of its worsted coatings, as customers' contracts often, if not always, stipulated for a Huddersfield finish. Surely this has been a compliment to if not an acknowledgment of the superiority of Huddersfield goods.

Different leading manufacturers have laid claim to having been the originators of cork screw designs, but whoever may be entitled to that honor, there has been no doubt of their success in the markets. Designs Nos. 1, 2 and 3 are said to have been amongst the earliest to receive that title and they were amongst the earliest to take the markets, and made by a manufacturer whose reputation and name are a password for high-class goods. Design No. 4 is another which took the market in the early days, and bears the double title of the "Campbell" or "Mayo," according to district. As a neat and smart design, it has always held its own, and could seldom be omitted from a range of good designs. Its wearing qualities were amongst the best, and the tendency to glaze or shine in wearing less conspicuous than most others. Design No. 5 may claim precedence over all others in extent of sale. This has been known in the trade as the "13-shaft screw." Its extreme neatness has been its great recommendation, and its sale has been enormous, extending over more than fifteen years. The demand for it grew year by year, till at one time it seemed unlimited, and new looms with scope enough for the design could not be turned out fast enough.

Designs Nos. 1, 2 and 3 can be made as follows: Warp A: 2/48's worsted, 6800 threads, 68 in. wide in loom, straight draft. Reed: 20 dents per inch, 5 inches a dent. Weft B: 2/36's, 70 picks per inch. Clear finish, 56 inches.

Design No. 4: Serge overcoating. Warp: 2/12's, 2208 threads, 66 inches in loom; on 8 shafts, straight draft. Reed: 4/9½'s. Weft: 2/12's, 40 picks. Rough finish, 56 inches; 26 oz.

Design No. 5: Warp: 2/40's, 6256 threads, 68 inches wide in loom. Reed: 23 dents per inch, 4 in a dent. Weft: 1/14's, 72 picks per inch. Clear finish, 56 inches wide. Finished weight, 23 oz. per yard.

Design No. 6 is a fancy trousering showing a clear stripe, and forms one of the neatest spring effects. It is given here in simple form to meet present taste, but can be varied in warping to a large extent, and will form an excellent range.—Textile Manufacturer.

Australian Wool Clip, 1897-98.

Goldsborough, Mort & Co., Melbourne, Victoria, in their annual review of the Australian wool trade for the season of 1897-98, speak of the year just elapsed, or since their annual report, as having been for the Australian wool grower, one of grave anxiety and loss.

Apart from the disappointment of unstable and diminished values, which was the keener from the fact that the check to production of the past four seasons had encouraged hopes of an advance, a calamitous drought has made it one of the most arduous pastoral years on record, alike in its terrible losses of stock and the impoverished clip ultimately shorn. Notwithstanding the great losses during the drought of 1895, the bare maintenance of numbers in the partial drought of 1896, and the strenous efforts of station improvements and administration, the mortality was shocking, and the clip now passing into consumption one of the most inferior Australia has produced.

In regard to the wool that is for this current year's consumption, and which American manufacturers will have to operate in, if they use this country's growth, Goldsborough, Mort & Co. say that the effects of the drought were shown in a marked degree on the clips of the past season from almost every district, the general character in regard to length, strength, and condition, as well as the weight cut per sheep, being the most inferior marketed for many years.

We introduce, herewith, a map of New South Wales and Victoria, showing the wool districts of these colonies. From the Western District of Victoria the wool was moderately light in yolk but dusty and generally tender; to this, however, there were exceptions, a few well-known brands closely approaching their usual high standard. In Gippsland wools the effect of a better season was apparent, and they were above the average in color, condition and growth. The Wimmera and Northern Victorian clips were, however, very thin, heavily loaded with earth, very tender, and in many instances the fibre was completely perished.

From New South Wales the Eastern Riverina wools, while still standing to the front, were below their usual standard; they exhibited less depth of staple and brightness, much more dust, and nearly all clips contained a considerable proportion of tender fleeces—much that was not actually tender was weak, and lacked elasticity. Central and Western Riverina showed the full effect of drought; the clips were dull, dusty, tender, impoverished, and unattractive. From the Central Division of New South Wales many of the clips showed a fine, soft, fairly-sound fibre, but were rather short in staple, and carried more than the usual quantity of earth, and less yolk. The product of the Northern Districts was rather short in staple, and fine-haired, but moderately sound, with not much yolk, but a good deal of dust; while from the Western Division generally, came an attenuated fibre, without elasticity, little yolk, and a liberal supply of red earth, particularly along the perished backs.

Queensland wools from the Mitchell District were also short in staple, but soft, of good color, with a scanty supply of yolk, free from seed, but very dusty. From the South-west the clips were short-stapled, deficient in yolk, and dusty, though free from seed. Those from the South-east showed to more favorable advantage, being cleaner and less tender, and also not exhibiting such diminution in length of staple. Many scoured clips from the Mitchell District were submitted during the season, and were noticeable as being well washed, of good color, fine, soft, and free from seed.

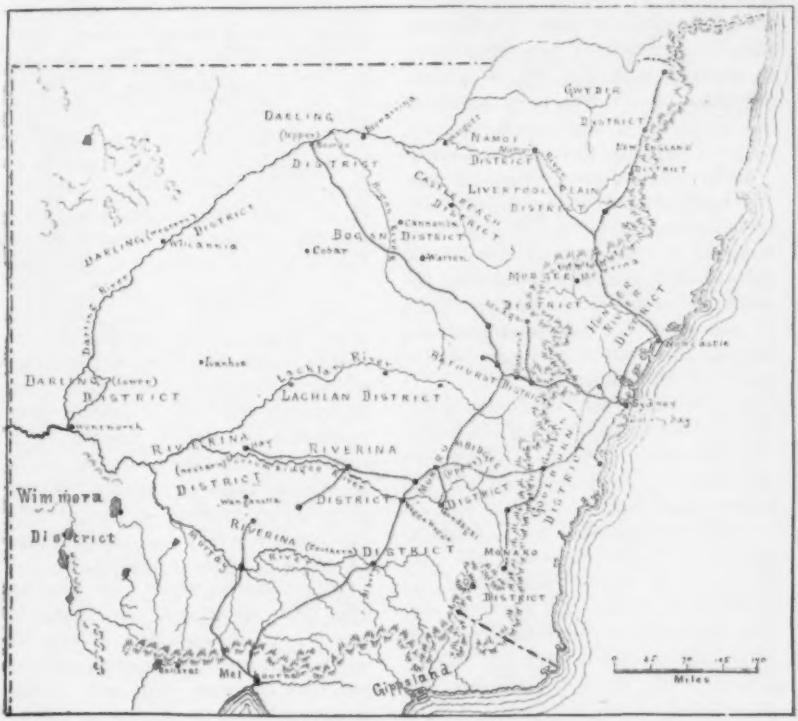
The New South Wales clip as a whole showed only too clear evidence of the far-reaching nature of last year's drought, a very large proportion of the season's yield being weak and short in staple and in poorly-nourished condition, though, on the

other hand, lightness and freedom from burr and seed (relatively, that is, as compared with the preceding season) to some extent compensated for such imperfections.

From the North-west, wool proved tender, and heavily impregnated with dust. In the northern districts of the Upper Darling, Liverpool Plains, and Gwydir the effects or drought were not so particularly noticeable, and consequently a better nourished staple, of average strength and condition, was available therefrom. On the other hand, from the eastern portions of the Liverpool Plains, where dry weather had been persistent, less attractive samples came to hand.

New England clips vary greatly both as regards growth and condition. Mudgee wools well maintained their traditional reputation for general excellence, though their normal brightness was less in evidence than usual. From Bathurst the wool proved disappointing, alike as regards growth, strength of staple, and general appearance, whilst many of the smaller clips were undersiredly conspicuous by reason of the lack of discrimination evinced in skirting and classing. Want of body and tenderness of staple were specially noticeable in wools from the Upper Murrumbridgee District; whilst of the production of the Monaro districts, where favorable weather had, as a rule prevailed, a large proportion proved to be of bold, well-nourished, and sound staple of good combing type.

As regards the condition and quality of wool in South Australia, the effects of the drought have shown all along the line, and in many cases the wools from the grass country have suffered more than those from the saltbush districts. In a few instances, wools from the Adelaide Hills are up to the average, but these are quite the exception. There has been much of poorly-grown, short, and tender wool in all the catalogues, and though the early Northern and South-eastern wools were comparatively dry in condition, the later clips have shown an amount of yolk hardly to be expected in so bad a year. There has been less of seed and burr than usual.



WOOL DISTRICTS—AUSTRALIA.

KNITTING DEPARTMENT.

Knit Goods Situation.

The presence of the war cloud was not seriously felt in the knit goods trade until the middle of April; then it shut down like a fog. In consequence, at this writing, business is confined to immediate requirements. To put the outlook in a nutshell, the closest observers look for a continuation of present conditions several weeks. They argue that not until the Spanish-American embrogollo is cleared away by mutual agreement, or two or three important encounters have indicated the strength of the opponents, will there be anything like general buying.

Aside from the great weight of war, which will sooner or later adjust itself, the situation contains few dispiriting elements of moment. In view of the uncommon factor now influencing the market, it seems advisable this month to note several of the manifestations, leaving the reader in large part to draw his own inferences.

At the outset the foundation of the Knit Goods Manufacturer's Association should be mentioned. This does not include hosiery interests. It has yet to appear how many mills will enter the combination. Not enough to warrant the carrying out of the plan are assured. The directorate of the Association includes the names of several men who are far from being rainbow chasers, and if they are able to conciliate the different interests, the Association cannot but have a formidable force. If they do not harmonize these interests, another association is a certainty. And, indeed, there are those who say that another combination—of not necessarily a rival nature—is unavoidable. The formation of this association is wholly in line with the probabilities we have indicated more than once in this letter since last fall, when the Valentine combine failed, in large measure, to accomplish its aim. Since then it has only been a question of time when another organization would be established with deeper foundations, based on more intimate relations. The preliminary steps could not have been kept quieter, and little is likely to be heard of any other combine before it becomes an actuality.

Now something about the drift of style. To begin with hosiery: Fancies are drifting more and more into lisle goods and half hose. There is a steady increase for light colors, which go even to white and cream grounds. This is in line with the call for unbleached hose among the fine trade. The rage for fancies, as a whole, has by no means reached high-water mark. It should be noted, however, that part of the plaid trade is drifting toward hair-line stripes and Roman stripes. Chemnitz manufacturers say there is a marked falling off in the demand for fleeced hose. The movement toward finer gauges in imported cassimeres is to accomplish a saving in the duties. Speaking of tariff reminds one that the host of cotton imitations of woolen hosiery is increasing every week, owing to the prohibitory rates on woolens. The unprecedented amount of wet weather the last six weeks has put a damper on golf and sporting hosiery.

Unfortunately, underwear does not offer such opportunity for display as hosiery, and, consequently, cannot similarly avail itself of the craze for fancies that has gone wide open in foot coverings, since the advent of the low shoe for cycling. A great part of this fancy demand is supplementary, as is proved by the fact that the demand for staple black stockings has not appreciably diminished. This demand for fancies is not a fad (fad stands for day), and happy the dealer who comprehends the fact without loading himself with glaringly unique designs. Complaints continue regarding fleeced goods, particularly fleeced underwear. It is the old story of intense competition in a temporarily promising field,

—a survival of the fittest amid a host of pretenders. Cotton mixtures steadily increase as the new tariff goes marching on.

Duplicate orders are insignificant on everything.

There is a line in a certain play, "All that Arizona needs is a little rain and good society." All that the knit goods business needs is a dry spell and a little peace.

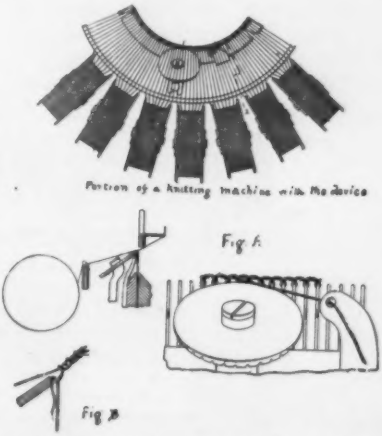
Knitting Machine Device.

We illustrate, herewith, a recently invented device relating to knitting machines, having spring bearded needles, and of the class for knitting a fabric having in addition to the warp and weft threads, a third thread, formed into a knitted stitch.

The object of the invention is to provide means for properly guiding the weft-thread to the needles and the knitting-wheel; and it consists of a rotatable device having a portion engaging the weft-thread in such a way as to guide it on the outside of the row of needles; and the invention also consists in a wheel for guiding the weft-thread, the wheel being journaled so as to have a portion to engage the weft-thread and lay it properly upon the needles of the machine.

The accompanying drawings will give a good idea of the device. As it relates only to the weft-thread-laying device, we have not illustrated any of the other parts of the machine, and hence they may be of any approved pattern and kind. By referring to the drawings, it will be seen that journalled in a support outside of the needles is a rotatable wheel, arranged at an acute angle relatively to the needles, and having its edge in contact with the needles, with its edge formed with a series of notches or serrations, properly placed to receive the needles as they move past the wheel. Referring to Fig. A, it will be seen that there is a guide through which the weft thread is fed, the latter extending from an aperture in the guide to the point of contact of the wheel and needles, so as to lie in a groove or recess formed by the same.

The thread which forms the knitted stitch is shown in this diagram as being on the needles, the warp thread being indicated by dots. When the needles revolve and move past the rotatable wheel, the thread is carried around and lies closely against the knitted stitch, and over the tops of the needles, so as to be knitted into the fabric by the knitting wheel, which



is here omitted. The position of the thread when it lies between the wheel and the needle is illustrated in Fig. B. The essential feature of this device, it should be said, is the movable support arranged to lay and hold the weft thread over the tops of the needles.

By means of a device of this character the thread may be supported during the time that it is passing from the guide until it is laid upon the needles. It frequently happens that unless a support of this kind for the thread be employed the thread will drop away from the needles or will not be guided properly to the same, so as to be knitted into the fabric by the knitting-wheel. The eye through which the thread passes must perforce be slightly lower than the needles, so that the tendency of the thread is to drop off from the same, especially when there is a knot in it, which, catching in the guide, causes a momentary stretching or tightening of the thread, thereby allowing the latter to drop from the needles when it contracts. By employing this device

the thread is not allowed to slip and is continuously carried to the needles and supported until it is properly laid upon the same.

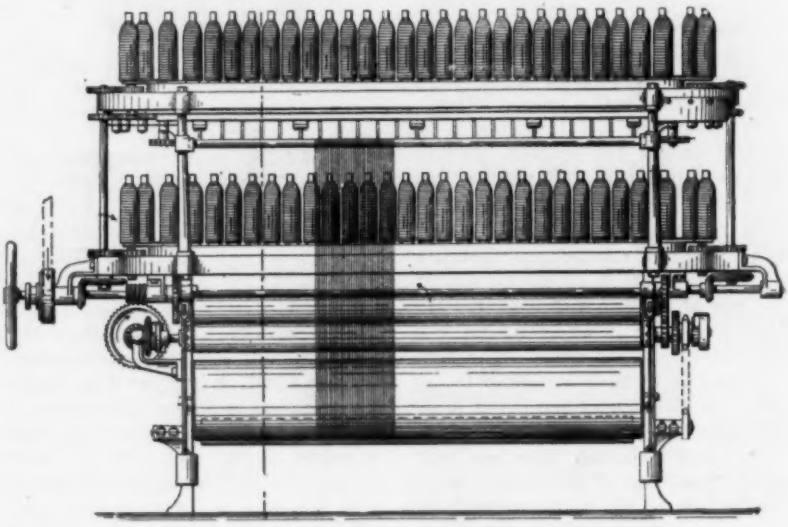
The Millar Loom.

STRAIGHT KNITTING MACHINE.

Some recent improvements have been made to the Millar straight knitting machine, more familiarly known as the Millar Loom, which we were the first to give a description of in any textile journal, in our issue of last January, where a perspective view of it appeared. This loom has been exploited more in England than in this country, and efforts have been made there, but with what success we do not at present know, of floating a corporation for the purpose of its manufacture, with a share capital of $1,750,000.

The first general meeting of the subscribers to the stock of the English company was held the latter part of February. At this meeting it was stated that a great many difficulties had been contended with, chief among them being the engineers', or mechanics' strike, which hindered the building of the looms. The first loom, as improved, has just been finished, and, by the projectors, it is looked upon as a satisfactory piece of work. It is proposed to subject this loom to a series of tests before going further towards the manufacture of the machine. It is stated that a number of applications have been made for trial looms, and the future of the company will depend upon the success of its trials.

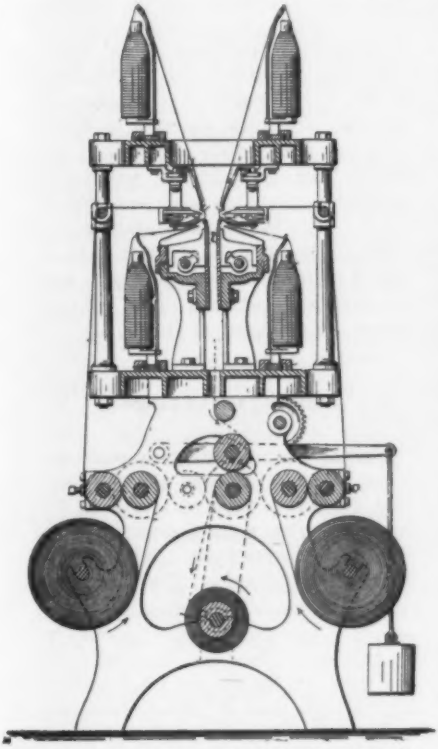
The Millar loom is an American invention, and the American patents are owned by the inventors or their assigns. The foreign patents, alone, belong to an English company. We do not propose at this time to go into the alleged merits of this knitting loom, but shall confine ourselves in this article to the machine in its present form, with recent improvements, which will undoubtedly be understood by an examination of the accompanying illustrations. This straight knitting machine, or knitting loom, as it is sometimes called, consists in the novel construction and arrangement of parts whereby the fabrics produced by it is composed of a series of upper knitting threads interlocking with each other and with the warp threads, in a series of lower filling



THE MILLAR LOOM.—SIDE ELEVATION.

threads alternating with the upper threads, as noted in our diagrams, and laid continuously in a straight manner along one side of the warp threads.

While the machine, as first exploited, was capable of operating smoothly at a comparatively quick rate of speed, it has been found from experience very desirable to increase the speed, and thereby correspondingly increase the percentage of output or product.

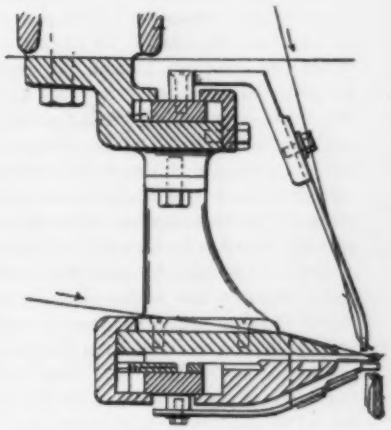


THE MILLAR LOOM.—TRANSVERSE SECTION.

The recent improvements that have been added to the machine are for the purpose of successfully driving it at a faster rate of speed, reducing the working friction, and placing the parts so that they may be more accessible for inspection, adjustment, etc., and for a more uniform traveling of the guides for the threads.

The view of the side elevation will show the general arrangement of the traveling mechanism, and the means for operating the several thread and guide carrying chains. It will be seen by referring to this diagram that the filling or weft threads are wound on the lower series of spools or bobbins, better seen in the transverse section view. The upper knitting threads are similarly wound, and, like the lower series, are carried by the links of a chain. The several chains and guides are so set or adjusted with respect to one another that they all travel in unison, continuously, at the same rate of speed.

In the transverse section view, it will be seen that there are two sets of needles, and also two complete sets of thread or yarn, the arrangement being such that two connecting webs or widths of fabric are produced simultaneously. We have added an enlarged view of one of the sets of needles, so that their arrangement may be better seen. Each set of needles, guides, etc., operate to introduce the threads at the upper edge of the corresponding needle bar or plate, the fabric produced passing downwardly through the narrrow central opening, as will be seen, thence round a guide roll, to and between a pair of driven friction rolls, to the web beam or roll on which the fabric is mechanically wound.



KNITTING DEVICE.

A Newly-Patented Machine for Knitting Gloves and Mittens.

There has recently been patented a knitting machine of which the special feature is that a great variety of stitches can be produced in knitting gloves and mittens. It is a power machine and yet all the fancy effects that hitherto have been obtained on hand machines can be produced. It is a latch needle machine on the Lamb principle. The novel feature is that there are two sets of needles of different lengths whose butts are on different levels. These needles are actuated by two sets of cams, which are in turn actuated by the pattern chain operating on the cam carrier, and by means of the cams the different sets of needles are locked or unlocked. When the cams are locked, the needles actuated by those cams will knit. When the cams are unlocked the needles will not knit. The needles may be made to knit either a plain stitch or a tuck stitch, the plain stitch being made on all the needles working one after the other in succession, while the tuck stitch is made by knitting on all the needles in one stroke of the cam carrier and on only a portion of said needles, as, for instance, each alternate needle on the return stroke, and then again on all the needles, and on the second return stroke knitting on those needles only which the first stroke did not knit. The details by which this method of operation is accomplished are quite simple. The possibilities in the way of fancy stitches seem to be very great. Its specialty is the French tuck, but the cross tuck and other similar stitches can be made as well; also, knit gloves with raised backs and glove fingers, while the inventor claims it is equally well adapted to fancy sweaters and novelty goods. The inventor is not in a position to put the machine on the market himself, and has, as yet, made no arrangements for doing so. He informs us that he would either sell the patent outright, or make such other arrangements as would promise the best returns.

The advantages of this machine are: First, it will make any tuck stitch desired, and is especially adapted for the "French tuck," or raised cross-tuck stitch. It will change automatically from any tuck stitch to plain, while in motion, between each stroke of the cam carrier if desired. One thread only is necessary to produce these tuck patterns, the two sets of needles receiving the yarn from one feed. By adding colors, stripes, blocks, checks, spots, and an unlimited number of patterns, can be made.

This machine works with a loose needle bed, which enables it to be changed instantly from the coarsest to finest gauge, or from hands of gloves to fingers. This machine is practically adapted for making sweaters, ladies' vests, etc. In the manufacture of knitted gloves it is claimed that it will save from 30 to 40 per cent., and is especially adapted for knitting fingers on any kind of gloves.

Necessity for a Change.

A great many attachments, and novelties, both for flat and circular knitting machines, have of late been introduced. That more wonderful novelties will appear in knitted fabrics, than any one can imagine, is not far distant. As I made mention, a few years ago, in your magazine, knitting was in its infancy. Thus far my prediction has been verified, for the many designs that I have seen of late justifies me in saying that next year will show such a variety of knitted fabrics, that it will astonish the trade, thus showing the necessity for a change, and manufacturers will do well to take heed.

The revolution in knitting frames may be the forerunner of doing away with some other line of textile fabrics, as the knitted undergarments has superseded the old line of woven flannel goods. Very few of the latter are now worn.

Considering the large diversity of knitted fabrics which are now made,

with the many devices and attachments that have been adopted for such, they have made it extremely difficult to many knitters unless they are very ingenious or experts at their calling. For example, a short time ago in a mill where I was called to take charge, a manufacturer in the same town, who made knitted linings, and who purchased his yarn, called at the mill office to see if we would make him some yarn, as we had carding and spinning machinery for our own use. We agreed to make him a small lot, as an experiment, after telling me what he intended it for. He gave me the guage, etc., of his machine, for he had a large circular frame made for the purpose. The yarn had to be made from coarse, lamb's pulled wool, something like Scotch cheviot, the size to be nearly 27 1/3 grains, a very coarse yarn to be used on power frames. The roving on the finisher card had to be made as heavy as possible, and the delivery on the spinning mule just enough to make a good even round thread, with twist enough to wind and knit well. As I was anxious to see the result, I went to the manufacturer to find out if it was satisfactory. I was glad when he told me it was all right. He took me into the mill and showed me some of the cloth, which was very heavy, with a cotton back, and the wool yarn for face, something similar to plush work. The goods made were beautiful, for lap robes, muffs, capes, etc. Colored a glossy black with heavy linings, it takes a good judge of furs to tell it from the genuine, for the coarse wool that I used, when teazled, and the twist I put in the yarn (left hand twist) gave it the curly appearance of coarse fur more then of wool. Some of our swell overcoats and caps, buffalo robes, etc., are made on the knitting frames of today, closely resembling the cheap astrachan. These goods leave a good margin to the manufacturer, and as the old adage goes, "the early bird finds the worm," so with the manufacturer that is alert.

Old Superintendent.

Chemnitz Knitting Industry.

Editor Textile World:

Yarns, one of the main factors in the value of almost all forms of textiles, are high and are going higher. Orders for cotton yarns were not as large as good prospects for '98-'99 would warrant. Combed yarns stand well; so, too, do yarns for embroidery. The Union of Manufacturing Spinners pushed the price up about half a cent per pound. (4pf per kilo).

Hosiery has held its own, especially in fancies. These are going in goodly quantities and prices. The demand for staples is growing with every mail. The supply of fancies is not nearly up to the demand; and this is by no means beyond expectation. No one expected such a rush six months ago; but once the "craze" took hold, no one was surprised to see it increase. The very bright bases, for plaids, are giving way. more and more, to softer and more subdued colors; notably tan and marine blue bases. Stripes, too, find favor; this because fancies are fetching good prices and because no one can turn plaids off fast enough. Sporting hose, golf, bicycle, and lawn tennis goods are supposed to harmonize with shirts and sweaters this season.

Winter goods go slow. Orders from New York, Boston, Chicago, etc., etc., do not come in as fast as manufacturers would like to book them. No one is hiring new clerks for booking purposes. American buyers are taking their own time in ordering. Fleece lined goods went fairly well, taking the place of woolens; but in by no means such big quantities as was expected from reports that reached us from that side. American buyers, up to date, have been little more numerous than white blackbirds. One or two have wintered here, but bough: only in such quantities as circumstances in the United States warranted. Everyone is eagerly awaiting the coming of O'Connel, Beers, Shiff, Mullen, etc., in March. Even England, one of the very best customers on Chemnitz's books, bought carefully and in much smaller quantities than

usual, even for the colonies. Brazil's reduced tariff rates, concerning which no one had the secret, though they took effect from Jan. 1, 1898, are looked to as aids and quickeners of trade. It may surprise you; but one of the biggest factories in Saxony sends more than half its product, especially woolen hose, to England. There are no particularly new or nice novelties. I can conceive of no nicer hose than the beautiful plaids now being turned off. I am told that Troyes, backed by Paris, is turning off nothing more beautiful.

Gloves are going along at the old gait; slowly. Prices are low, profits small. Winter orders were not particularly large, still they kept the help at work. Ringwood's have gone well, so well that it was hardly possible to put forth a sufficient supply. If some one would only push a particular kind of textile glove, running it as plaids are running and as plaids are likely to run, he would win the everlasting gratitude of the glove men.

Orders, on hand for underwear are filled as fast as manufacturers can make goods. No one is able to say just to an hour how soon he can deliver; for, foolishly enough, lots of Continental buyers waited till the last moment before placing orders, thus crowding the knitters. Every effort is being made to come to time.

As I was about to seal this letter, I learned that there is no change in the hosiery situation; that yesterday's mail, from your side, brought tidings of no turn in the plaid tide, that blacks would go well, etc. I learn also that manufacturers here have no fears in the matter of orders for next season, that their only fear is that they will not be able to carry out the orders booked. In fact, the orders already entered can hardly be filled on time. Lucky are those fortunate enough to be able to fill; for new orders for 12 to 18 months are ready to their hands. I saw several loads of machinery labelled U. S. of A.

An interesting phase of industrial life here is the interest taken by everyone in supporting the new naval appropriation bill. Bismark's famous saying, "A good merchant marine is the handmaid that will help all other industries, of agriculture, manufacture and commerce." The day we give over our freight or carrying trade to others, that day will date the destruction of our home industries.

Chemnitz, Saxony. ARISTIDE.

Verviers' School for the Textile Industries.

Editor Textile World:

Towards the end of 1875, Verviers, in Belgium started out to get up a "Scuola Superiore Manifatturiera" as the Italian, from which I translate puts it, or Manufacturing High School. It was to be dedicated, especially, to everything connected with the city's or section's textile industries. Subscription lists were opened and sent out to private parties who contributed considerably large sums. After various vicissitudes, aided by the national government, by the province of Liege and the Commune, a suitable building was put up, equipped and opened. In October 1894, classes were organized and instructed. Three years have passed, prosperous and progressive years. Of no institution in Verviers are its citizens more proud than of the school that aids its workers in wool, cotton and silk. The school has demonstrated its right to be, a dozen times over. The courses of instruction, conditions of admission, the hours of study, etc., constituted grave questions which were happily and most successfully solved. It was and it is believed to be best to keep its courses for the chiefs or captains of industry, reserving for operatives and technicians the so-called professional schools.

The course covered by this school takes four years. The first year's work is entirely scientific, the second year's scientific with practical application; in the two last years, entirely practical. Each year sees an increase in the number of students.

The course covers, in matters taught, industrial chemistry, dyeing

the technology of textiles, and raw materials for textiles, weaving, mechanics, elementary (theoretical), and applied, the putting up, taking down and mending of machines, physics, electro-technical laws, descriptive geometry, industrial and commercial geography, industrial economics, accounts, languages, especially English and German. There are regular and free students. The former, to get a degree, must undergo specified examinations.

Belgians pay 250 francs ($50.) annually, strangers 1000 francs or $200. The so-called free students, persons who are permitted to attend any course they please, without being bound to regular hours, courses, etc., if Belgians, pay $4.00 per annum for every hour in the week of theory that they take; and $20.00 for every hour in the laboratory; strangers pay four times as much. Strangers are not admitted to the Verviers or Belgian factories without a special permit. To be admitted to the school, one must be 16 years old, must pass the examination prescribed for admission, and pay $5.00. The examination covers French, Flemish, German or English, history, geography, arithmetic, algebra, geometry, trigonometry, descriptive geometry, analytical geometry, drawing and designing. The final examination confers upon the person passing it successfully, the title of "Engineer of the High School of the Textile Arts." It may not seem much, but it really means a great deal.

Attached to the school is a most excellent library of technical books, pertaining, particularly, to textiles, and a magnificent collection of machines, samples, etc. There are machines for power and hand to help in instruction; besides a cabinet of physical objects and a laboratory of chemistry and dyeing. It is to schools such as this that Belgium owes her present position.

But Belgium's best have not done for her what Germany's have done, and are doing, for that country. Here they have helped beyond the dreams of their original founders. They are as much, or more, an integral part of this people's popular system of education than are the famous Folks' schools (Volksschule). At every turn in the textile lines, these schools confront us. No industry is so insignificant, at least in Saxony, that it cannot command capital enough for a school. "Who has the schools has the future," is the famous saying of Bismark. Give America such schools, and Saxony will have to seek other markets then for the major part of her textile output. Not what the United States are or have been without these schools, but what they would be with them. Not what these people are or are not with them, but what they surely would be without them, is the question to ask. The answer will not be wanting.

C. J. Brown.

Verviers, Belgium.

Plush Knit Goods.

We are in receipt of a specimen of plush knit goods, made with special reference to its use in the Klondyke region. It is of great thickness and warmth. We can say but little about how it is made, at this time, as we are not permitted to do so, more than that the machine upon which it is knitted is of great diameter (from 36 to 56 inches) with feeds from 16 to 25, and more, if desired. The gauge is very coarse, and the amount of cloth that can be produced in an hour, is said to be astonishing. The machine, as reported to us, will knit as much in a given time as eight or ten power looms could produce. There is an application for a patent pending. This knitted fabric is for the inside lining of a bed to be used in the Arctic reigons. The bed for which this fabric is intended is made quite large, sufficient to cover the person comfortably, and sewed up in the form of a bag. The outside covering of the bed is made of good rubber, or A-1 oil-cloth, underneath which is a good quality of duck, or A-1 sail-cloth, and under this is the knitted fabric in question. When taking possession of the bed, the person enters feet first, and then covers his head with a flap.

POWER DEPARTMENT

O. R. YOUNG, M. E., Editor.

Chalk Talk.

TO FIND TOTAL HEAT OF STEAM.

Heat is measured by the change of temperature it produces in a given weight of any substance. A heat unit is that amount of heat which will raise the temperature of one pound of water one degree F. at its point of greatest density which is 39 degrees F.

Upon the application of heat to the bottom of a vessel containing water, the temperature will rise until the boiling point is reached, when steam will be rapidly formed.

At this temperature the thermometer ceases to give any indication that heat is being added.

If, however, the heat is applied until all or a part of the water has been boiled away or evaporated, for each pound of water so evaporated there will have been absorbed a definite quantity of heat.

From the time that the heat was first applied until the water commenced to boil, the amount of heat absorbed is called the "sensible heat" or that which can be measured by a thermometer, each pound of water having absorbed a definite number of heat units which is called the "heat in liquid."

As steam is formed and water evaporated, for each pound of water transformed into steam, an additional and much larger quantity of heat is absorbed, and this is termed "latent heat" or "heat of vaporization."

The heat in liquid added to the heat of vaporization is equal to the total heat.

Water at 32 degrees will require an addition of 180.9 heat units to bring it to the boiling point at atmospheric pressure. Thus 32 plus 180.9 equals 212.9 heat units, which is the sensible heat or heat in liquid. In other words, water at a temperature of 212 degrees has absorbed 212.9 heat units for each pound.

To evaporate each pound of water into steam at atmospheric pressure, will require the additional amount of heat of 965.7 heat units, which is termed "latent heat" or "heat of vaporization."

Adding the sensible heat 212.9 to the heat of vaporization 965.7, gives the total heat or 1178.6 heat units in one pound of steam at atmospheric pressure.

For each degree above 212 F. as indicated by a thermometer, the total number of heat units in one pound of steam increases at the rate of .305 of a heat unit, thus to find the heat of steam at any given pressure, it will be necessary to know the temperature which is due to that pressure.

Rule. Subtract 212 from the temperature of the steam (which may be found by placing a thermometer in the steam pipe, or by reference to a table of temperatures corresponding to pressures).

Multiply the remainder by .305 and add this product to the total heat of steam at atmospheric pressure, which is 1178.6; the sum will be the total heat units in one pound of steam at given pressure, from water at zero.

For example, it is desired to find the total heat units contained in one pound of steam, the pressure of which as shown by the gauge is about 105 pounds.

To find the absolute pressure, 14.7 pounds must be added to the gauge pressure which makes practically 120 pounds.

By reference to a table it is found that the temperature of steam due to a pressure of 120 pounds absolute, is 341 degrees F.

Then from the rule, 341 minus 212 equals 129 degrees, which is the dif-

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Plate XXVIII.–

To Find Total Heat of Steam.

$105\frac{3}{10}$ lbs = Gauge Pressure.

$14\frac{7}{10}$ lbs = Atmospheric Pressure.

120 lbs = Absolute Pressure.

341 Degrees = Temperature of Steam at 120 pounds.

1178.6 Heat Units = Total Heat of steam at atmospheric pressure.

$$\begin{array}{r} 341 \\ 212 \\ \hline 129 \end{array} \qquad \begin{array}{r} 129 \\ .305 \\ \hline 645 \\ 387 \\ \hline 39.345 \end{array}$$

965.7 = Latent Heat { Steam at
212.9 = Sensible " { Atmospheric Press.
1178.6 = Total " "

$$\begin{array}{r} 1178.6 \\ 39.345 \\ \hline 1217.945 \end{array}$$ = Total Heat Steam at 120 Pounds Absolute Pressure.

ference in temperature of the water at boiling point, between atmospheric pressure and 120 pounds absolute pressure.

It has been previously stated that the total heat above 212 degrees increases at the rate of 0.305 of a heat unit for each degree F.; thus, 129 multiplied by 0.305 equals 39.345 heat units.

As 1178.6 heat units represent the total heat of steam at atmospheric pressure, then 1178.6 plus 39.345 equals 1217.945 heat units, which is the total heat of saturated steam at 120 pounds absolute pressure.

By saturated steam is meant the normal condition of steam generated in free contact with water, it being condensed if its temperature is reduced, and more water evaporated if its temperature is raised, or in other words, it means dry steam.

Care of Engines.

E. H. KEARNEY.

In these days of scientific engineering, when problems are figured into the decimals, and the engineer is required to use his best efforts towards securing safety and economy in the running of his plant, it is absolutely necessary that every detail in connection therewith receives its share of consideration.

It may be said, in this connection, that no part of an engine requires more intelligent care in the interests of safety and economy than the cylinder and piston, mechanically considered.

Because the piston is invisible, it follows that it does not always receive the attention that is given to parts that are exposed to view. In many instances neglect of this detail has been a prolific source of disaster.

One of the most common causes of loss in the cylinder is leaking packing rings in the piston. When these rings do not properly fit the cylinder bore, or are faulty in the joints, and loss is caused by allowing steam to blow from the admission end past the piston into the opposite end, which is open for the exhaust, it is obvious that as this steam does no work, the fuel consumed in making it is a dead loss.

A good way to ascertain if the piston is leaking is to put the engine on the dead centre on the crank end; then take off the cylinder cover on the head end and admit steam back of the piston. If it leaks the leak can readily be seen.

Another method is to place the engine on the centre—no matter which one—and if the cylinder is piped for indicator, open cock from opposite end from which steam is admitted. While this method would give good results if the valve was tight, it would not give the desired result if the valve was leaky.

An indicator diagram will show a leaky piston by a drop in the steam line, and a corresponding distortion of the expansion line, supposing that wire-drawing, or possibly a leaky exhaust valve, was not responsible for it.

While in some cases these leaks cannot be wholly prevented, owing to the cylinders being badly scored or worn, in the majority of cases they can be remedied to a very great extent.

Packing rings that are found to be too small for the cylinder bore should be set out either by tightening the setting-out bolts or by peneing, the best method obviously being determined by the circumstances. To spread a ring by peneing its inside circumference it should receive a succession of hammer blows from the ball, or pene, of the hammer around its entire length, and care should be taken that the blows be struck as nearly as possible in the centre of the ring and at equal distances apart, otherwise the ring is apt to assume more or less of a spiral form, when it will not properly fit the joint, and it is liable to stick when going over portions of the cylinder that may be of different diameters by means of wear.

In spreading rings in this manner it is necessary to take into consideration the fact that a ring can be made tight without making it larger than the cylinder, that may be of varying

diameter by reason of wear, to any great extent, as most styles of piston rings have internal springs to assist their elasticity.

Where these rings are used, good results can be secure by making rings for the smaller bores, say up to 4 inches, not more than 1-32 inch larger than the bore; from 4 inches to 8 inches, not more than 3/64-inch; 8 inches to 12 inches, 1/16-inch larger; from 12 inches to 16 inches, 3/32-inch larger; from 16 inches to 20 inches, ⅛ inch larger.

It is a highly commendable practice to make periodical inspections of cylinders to ascertain whether the piston has lost its proper alignment by wear or other cause; if the cylinder has been cut; if the follower bolts are secure and free from fracture; if shoulders have been formed at ends of bore from improper lining of connecting rod, whether cylinder oil is causing deterioration by acid which it may contain, or from the other numerous ills to which this important part of the engine is liable.

Before starting an engine care should be taken that the cylinder is well warmed and that it is free from the water of condensation. Neglect in this regard is apt to cause leaky joints and packing rings and, in many cases, sprung piston rods can be traced to the same cause. The best test to ascertain whether a rod is sprung is to put it into a lathe and revolve between the centers. When a lathe is not accessable, good results can be secure by cutting Vs in a pair of wooden blocks of equal height and revolve the rods in the recesses.

To secure smooth running in an engine the packing rings should clear the bore of the cylinder a little at each end of the travel. Many engines are designed so that the rings travel over the bore about 1/32 inch. This provides a clearance for the rings and prevents the formation of shoulders.

When taking measurments to set piston in centre of cylinder, do not take them from the bore, but always from the centrebore. The reason for this is that while the bore may be badly worn, either vertically or horizontally, the counterbore receives no wear and retains the original alignment.

"Liners" that are put under the "horns" of "spider" should be cut so that they will have no lateral movement between spider and follower. If cut so as to be a loose fit the motion of the piston is apt to allow them to cut through the cast iron.

Follower bolts lose much of their original strength by reason of crystalization caused by alternate cooling and heating. A comparatively small strain will sometimes fracture a bolt that has been in use some years. Many engineers make a practice of renewing these bolts at certain intervals of time, and the practice is highly commendable. When the follower has been taken off for some reason and when bolts are replaced, it is the best method to bring them up to a bearing before putting a strain on them with a wrench. First bring up one bolt so that it bears; then do likewise with the opposite one. Continue in a circle and set up evenly upon the bolts in rotation.

It is poor policy to run an engine in ignorance of the location of the "striking points" on cylinder heads. These points should be marked on the guides so that the engineer can clearly see at all times that the piston has sufficient clearance at the end of stroke—which clearance, other conditions being favorable, should be kept equal at each end. If clearances have to be made slightly different to regulate travel of rings over counterbore, it is of slight importance.

The following is a simple, yet effective method of locating the striking points and counterbores: After the piston rod has been keyed in the crosshead, move it toward the crank end until the "spider" brings up solidly against the cylinder head. This is the striking point for this end. It should be located on the guide by a centre punch mark at the crank end of crosshead. Move the crosshead toward the head end of cylinder until the turned edge of spider against which the ring

will bear comes flush with the counterbore. Mark this point also on the guide at same end as before. Next move crosshead along and put in packing ring and riding ring. After these are in position move piston ahead until the ring on head end is flush with the counterbore. Locate this point also on the guide.

Now with a pair of calipers line up piston in the centre of counterbore and put on follower head. The piston should be moved through cylinder a few times to see if everything works freely. Put cylinder cover on head and move piston ahead until it strikes. This is the striking point for head end —locate on guide same as before. This makes the job complete, and when the connecting rod is put up it can be lined by these marks on guides.

When an engine has been erected or overhauled for repairs, and before the pistons are put into the cylinders, it should be "blown through." The throttle valve being opened, the steam allowed to blow through steam chest and ports into the cylinder, the valve gear being moved by hand so that the steam will blow through the parts alternately. If, by accident, nuts, washers, iron dust, or other substances should remain in the passages they will then be dislodged and a serious menace to safety removed.

Use good cylinder oil. A small quantity of such used judiciously is better than a cylinder flooded with a composition that is a lubricant in name only.

Electricity.

SWITCHBOARDS.

ERNEST W. DAY.

(Continued from April.)

For constant potential systems, switches should have a firm and secure contact, make and break readily, and not stop after motion has once been imparted to the handle, the object of this being to avoid the possibility of contacts sticking when switch is opened or closed under heavy currents.

Rheostats and resistance boxes should be placed on the switchboard, if not they must be located at least twelve inches from any combustible material or be separated therefrom by a non-inflamable, non-absorptive insulating material, the entire case to be constructed of metal or other non-combustible substance.

It is customary to secure rheostats to the back of switchboard, allowing a stem, which is attached to the movable arm, to project through to the front and to be operated by a hand wheel or handle placed thereon.

Great care should be taken to have all rheostat fittings electrically and mechanically perfect, as when dynamos are running together the failure of a rheostat or shunt field connection is a serious matter, often causing the loss of an armature.

Automatic cut-outs (fuses or circuit breakers) should be placed on each feeder leaving the switchboard.

When the feeder is to be used for lighting only, fuses will answer the purpose and the first cost is less; when, however, motors are to be operated, a magnetic circuit breaker should be employed to take care of the sudden and excessive calls for current to which a motor circuit is constantly subjected.

Lightning arresters should be attached to each side of every over-head circuit leaving the building; they must be mounted upon non-combustible bases and constructed in such a manner that an arc will not be maintained after the discharge has passed, there must also be no moving parts.

They must be located in easily accessible places, away from combustible material and as near as possible to where the wires enter the building.

In all cases kinks, coils, and sharp bends in the wires between the arresters and the out-door lines must be avoided.

A permanent ground connection should be made by means of metallic strips or wires having a combined conductivity of not less than that of

a No. 6 B. & S. gauge, copper wire, which must be run in as nearly a straight line as possible from the arresters to the earth connection.

Ground wires for lightning arresters must not be attached to gas pipes within buildings.

It is often desirable to introduce a choke coil into the circuit between the arresters and the dynamo, as this, while offering practically no resistance to the passage of the dynamo current, would cause a retarding influence on a lightning discharge, and make the ground connection an easier path for travel.

In no case should the ground wire from a lightning arrester be put into iron pipes, as this would impede the discharge.

Recording watt meters are sometimes used to account for the output of the dynamos, and are usually located upon the front of the board at a proper height to admit of readings being quickly and accurately taken.

Except in small installations using only one machine, a reliable amperemeter should be provided and placed in the circuit between switch terminal and bus bar.

When compound dynamos are being operated in multiple or parallel, the ammeter must be placed in series with the lead which comes direct from the brush of the dynamo, and not from the series coil, as otherwise all the current would not be indicated by the ammeter but a part would at times be taken off by the equalizing connection.

Practical Electricity.

TROUBLES.

A dynamo or motor carefully installed and properly running is truly a thing of beauty to those who have care of it and a source of satisfaction to its owner. Trouble, however, in one form or another is sure to come sooner or later, depending on the grade of the machine and the skill and care in handling.

It is likely therefore that a few hints as to the cause and remedy of such troubles will be acceptable to those who have the care of this class of machinery.

Obviously, the promptness with which such troubles are located and removed will have much to do with the success of the plant. Often indeed considerable expense is gone to in order to remove a fault, which with a little intelligence could have been remedied at trifling cost.

For instance so slight a thing as a loose connection will often cause the shutting down of a whole factory with scores of hands. Other troubles equally as simple but not so easily located will cause annoyance and delay. In such cases, some knowledge on the part of the man in charge in locating troubles would have enabled him to overcome the difficulty and save delays and consequent loss.

It is proposed in the following, to give a systematic method for detecting such troubles as these.

Fortunate it is, that the machines in question are mechanically so simple in their construction.

With the exception of the commutator and brushes, there are but two wearing parts; the two bearings which support the shaft of the armature. Quite in contrast in its simplicity to the steam engine with its multiplicity of wearing parts, oil cups and valves.

From the fact that the dynamo or motor has so few parts we are able to classify their troubles through their effects under five heads, which are:

1. Sparking at commutator.
2. Heating of the various parts.
3. Noise and speed.
4. Motor stops or fails to start.
5. Dynamo fails to generate.

Any and all of these effects are quite obvious, even to a casual observer; still a most careful and thorough examination should be made of the entire machine in order to be sure of facts and to avoid jumping at conclusions.

In the conisderation of the troubles as classified above the following order will be observed; 1st, the cause; 2nd, the symptom in detail; 3rd, remedy and how effected.

As is very often the case, a symptom

may be developed in a machine from several causes or a cause may result in several symptoms. We shall, however endeavor to make the distinction as clear as is possible without the help of the actual machines for illustration.

Sparking at the commutator is caused, first, by the armature carrying too much current, due usually to an overload: in the case of the dynamo, too many lamps in circuit; or in the case with the motor, excessive frictional load, from hot bearings, armature striking the pole pieces, belt too tight, or in general, too much mechanical work to be done.

Excessive voltage on constant potential circuits will also overload the system.

The symptoms are a continuous sparking at the commutator during the times of maximum load and tendency to slipping of the belt.

After a continuous run the armature becomes very much over heated and will burn out, if the load is not lightened.

In this, however, there is an exception, constant current arc motors. As the heating effect depends on the square of the current multiplied by the resistance (C^2R) both of which factors are constant in this instance, it is quite possible to overload machines of this type till the armature stops without risk of burning it out.

Excessive frictional load is readily detected by turning the armature around by hand.

Hot bearings will be treated more in detail under the head of heating of the various parts.

Any excess in current is of course at once evident at ammeter and this may be taken as a conclusive test for all such overloads.

The remedy for troubles of this nature is obviously to reduce the load, eliminate partial short circuits in the line and leaks as far as possible.

Constant potential motors, especially those above five horse power are frequently subjected to overloads and strain at starting.

If the starting box has too little resistance or is turned on too rapidly, it will cause the armature to start with a jerk and spark badly at first. A properly designed starting box will remedy the evil in the first instance and in the latter case, the exercise of proper care in starting. The handle of the starter should be allowed to remain an instant on the first and second contact points till the armature has attained some speed.

Second, brushes sometimes are not set at neutral points, the symptom of this trouble will be a sparking and cutting of the commutator, the intensity of which will vary with the shifting of the brushes.

The remedy can best be explained by reference to Fig. 1, which shows the proper position of the brushes. The points where the brushes are resting on the commutator where the greatest E. M. F. and the least sparking are obtained are called the neutral points, as represented in the cut by the points "A" and "B."

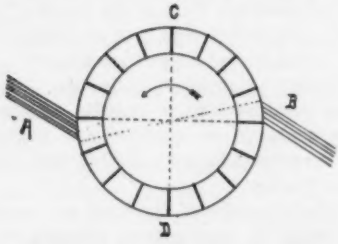

FIG. 1.

The line joining these two points has been termed the diameter of commutation. This line it will be noted is not at right angles to the line joining the centres of the pole pieces, but is shifted through a small angle depending on the direction of rotation and whether the machine is acting as a dynamo or motor.

With the dynamo the brushes will be given a forward lead, that is, they will be shifted from the horizontal in the direction of rotation.

With the motor the shifting of the brushes will be against the direction of rotation and will be given what is termed a backward lead.

(To be continued.)

DYEING DEPARTMENT.

Dye Recipes for May.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $3.

RECIPE NO. 65.

Dark Green on Worsted Yarn.

Wool Green S S on 100 pounds worsted yarn.

Prepare dye bath with

3 lbs Wool Green S S
(John J. Keller & Co., 104 Murray St., N. Y.)
4 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter in yarn at 120° F., bring to boil while turning, and turn to shade at that heat.

A fine, full shade of dark green is shown here, dyed with Wool Green S S. The shade is somewhat of a bluish tint, which can be easily lightened by adding yellow to the bath. Wool Green S S will be found to be a fast and cheap color. (See recipe 54.)

RECIPE NO. 66.

Light Blue on Cotton Yarn.

Direct Navy Blue 5096 on 100 pounds cotton yarn.

Prepare dye bath with

6 oz. Direct Navy Blue 5096.
(The Stone & Ware Co., 157 Maiden Lane, N. Y.)
10 lbs. Common Salt.

Enter in yarn at 160° F., bring to boil while turning, and turn to shade at that heat.

For dyeing light shades of indigo blues, Direct Navy Blue is very well adapted, as the bath exhausts, and level dyeings are the result. For dark shades on hosiery and knit goods, this blue is especially good. See recipes 40 and 61. In the latter, this dye is used in combination with Direct Brown 5095, for a shade of seal brown.

RECIPE NO. 67.

Black on Cotton Yarn.

Iso Diphenyl Black B on 100 pounds cotton yarn.

Prepare dyebath to start with

6 lbs. Iso Diphenyl Black B.
(John J. Keller & Co., 104 Murray St., New York.)
20 lbs. Glauber's Salt.

Enter in cloth at boil, and run one hour at that heat. For future kettles, use four per cent. of color.

Iso Diphenyl Black B produces a bluer shade than the B R brand of this dye. This house has put three brands of this dye on the market, and dyers of hosiery and other goods can produce several shades of fast blacks from them for the trade.

RECIPE NO. 68.

Blue on Cotton Flannel.

Alizarine Blue D R on 100 pounds cotton flannel.

Prepare dye bath with

2 lbs. Alizarine Blue D R
(Victor Koechl & Co., 79 Murray St., New York.)
50 lbs. Common Salt.
2 lbs. Sal Ammonia.

Enter in yarn at 110° F., bring to boil while turning, and turn 45 minutes at that heat. Lift and rinse off, and turn 20 to 30 minutes at 140 to 150° in a bath of

3 lbs. Blue Vitriol.

Rinse.

By after treating the D R Blue with Blue Vitriol, a very fine greenish shade of blue is produced, making it a very fast blue with an indigo hue. (See recipes 179 and 189, in the 1897 Supplements, and recipes 13, 30, 43 and 57, in the 1898 Supplements, for blues and blacks from these Alizarine dyes.)

RECIPE NO. 69.

Red on Worsted Yarn.

Lanafuchine S B on 100 pounds worsted yarn.

Prepare dye bath with

3 lbs. Lanafuchine S B
(Wm. J. Matheson & Co., 178 Front St., New York.)
4 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter in yarn at 120°; bring to boil while turning, and turn to shade at that heat.

Lanafuchine S B produces a somewhat bluer shade of color than the S G brand, sold by this house. Both brands are well adapted to dyeing piece goods, on account of their fastness and level dyeings.

RECIPE NO. 70.

Dark Brown on 100 Pounds Cotton Warp and Shoddy Filling Cloth.

Columbia Black F B, etc. on 100 pounds of cloth, white cotton warp and gray shoddy filling.

Prepare dye bath with

14 oz. Columbia Black F B
1 lb. Orange T A.
3 oz. Wool Black B.
(New York & Boston Dyewood Co., 55 Beekman St., New York.)
7 lbs. Glauber's Salt.

Enter in cloth at 120° F., bring to a boil in 1½ hours, run ½ hour longer with steam shut off. Rinse.

The above colors are very soluble in hot water, work very level on the fibre, and produce the same shade on cotton and wool in one bath. It would be well to compare this recipe with those of 188 (December, 1897) and 16 (January, 1898), in which similar combinations are used for blacks on union shoddy cloths. Columbia Black and Wool Black are used in all these recipes, the shades of black being varied by the use of Guinea Violet 4 B and Orange T A as in recipes 188 and the present one.)

RECIPE NO. 71.

Medium Blue on Cotton Yarn.

Dingley Blue on 100 pounds cotton yarn.

Prepare dye bath with

2 lbs. Dingley Blue No. 97.
(The Hanna Schoellkopf Co., 135 No. Water St., Philadelphia, Pa.)
20 lbs. Glauber's Salt.
3 lbs. Alum.

Enter in yarn at 140° F., bring to a boil while turning, and turn to shade at that heat.

Dingley Blue, like Dingley Yellow (shown in recipe 59), is a valuable dye, being direct, and working on the fibre with alum and Glauber's Salt, and at the same time producing a fast color, to washing and light.

RECIPE NO. 72.

Black on Worsted Yarn.

Soudan Black on 100 pounds of worsted yarn.

Prepare dye bath with

6 lbs. Soudan Black R R.
(Sykes & Street, 85 Water St., New York.)
4 lbs. Oil of Vitriol.
10 lbs. Glauber's Salt.

Enter in yarn at 140° F., bring to a boil while turning, and turn 1½ hours at that heat.

The range of the Soudan Blacks will be found to give excellent satisfaction to the dyer, for their fastness and cheapness, and because they will combine with acid dyes for deep shades. (See recipes 130, 152, 167, 172, and 192, in our 1897 Supplements.)

RECIPE NO. 73.

Bluish Gray on Worsted Yarn.

Gray N on 100 pounds worsted yarn.

Prepare dye bath with

10 oz. Gray N.
(Anchor Color Mfg. Co., 462 Cherry St., New York.)

Enter in yarn at 130° F., bring to a boil while turning, and turn 15 to 20 minutes at that heat.

For producing even and fine shades on wool or cotton, Gray N will be found to be just what is wanted. The colors are fast, and cheaply and quickly dyed. (See recipe 49.)

RECIPE NO. 74.

Black on Cotton Yarn.

Logwood, Etc., Extracts on 100 pounds cotton yarn.

Mordant for 2½ hours at 120° F., with 12 lbs. Sumac Extract.
(Stamford Mfg. Co., 133 Front St., New York City.)

Then give eight turns in

10 lbs. Nitrite of Iron.

Rinse off and dye in a separate bath with

20 lbs. Logwood Liquor No. 65.
2 lbs. Bark Extract.
(Stamford Mfg. Co.)

Enter in at 120° F., bring up to 160° F., while turning, and turn ½ hour at that heat. Lift out, extract and dry without washing.

The above method of dyeing produces a fine, even and clean black on cotton yarn. It is an old method, and a sure one, as even shades are bound to result. It is also quickly dyed, much more so than the one-dip method, as it requires no ageing. This black can be dyed at a very low cost. The amount of sumac used is for a standing kettle. The logwood and bark bath must be fresh with each batch. This is a combination which should attract attention.

RECIPE NO. 75.

Medium Blue on Worsted Yarn.

Sulphur Acid Blue B on 100 pounds worsted yarn.

Prepare dye bath with

1 lb. Sulphon Acid Blue B.
(Farbenfabriken of Elberfeld Co., 77 William St., New York.)
10 lbs. Glauber's Salt.
3 lbs. Acetic Acid.

Enter in yarn at 110° F., bring slowly to a boil while turning, and turn to shade at that heat.

Sulphon Acid Blue B. is a new color, and is very soluble. It goes slowly and evenly on to the yarn. It dyes a clean color, which does not rub off. To exhaust the bath, add ½ to ¾ per cent. of Sulphuric Acid. (See recipe 63).

RECIPE NO. 76.

Very Dark Blue on Worsted Yarn.

Logwood and Alizarine Blue G B on 100 pounds worsted yarn.

Mordant for 1½ hours at boil with

3 lbs. Bichromate of Potash.
2 lb. Tartar.

Rinse and dye with

6 lbs. Solid Logwood N.
(Stamford Mfg. Co., 133 Front St., New York.)
3 lbs. Alizarine Blue G B
(Anchor Color Mfg. Co., 462 Cherry St., New York.)
1¼ lbs. Acetic Acid.

Enter in yarn at 160° F., bring to boil while turning, and turn ½ hour at that heat.

A very fast shade of blue is shown above, dyed with a combination of Logwood N. and Alizarine G B. These two dyes, when combined, will produce fine blues, by varying the amount of dyestuffs. They combine well together, producing fast and cheap shades, This mode of producing blue-blacks and blacks, and blues, is practical, and the fastest shades are dyed in this manner. Similar combinations have been used in previous recipes, with most excellent results. A handsome medium blue shade on worsted yarn appeared in recipe 155 (October 1897) produced by the use of Alizarine Blue G B alone.

RECIPE NO. 77.

Red on Cotton Yarn.

Brilliant Red D. on 100 pounds cotton yarn.

Prepare dye bath with

3½ lbs. Brilliant Red D.
(A. Klipstein & Co., 122 Pearl St., New York.)
10 lbs. Glauber's Salt.

Enter in yarn at boil, turn one hour at that heat. Cool down bath for one-half hour, while turning slowly.

A fine, dark and bright shade of fast red is shown here. The dye used produces a very fine shade, and is one that the dyer can depend upon for the same result on each batch. (See recipes 45 and 55 for other shades, from this dye.)

RECIPE NO. 78.

Dark Reddish Blue on Woolen Cloth.

Toledo Blue O. on 100 pounds woolen cloth.

Prepare dye bath with

5 lbs. Toledo Blue O.
(C. Bischoff & Co., 87 Park Place, New York.)
15 lbs. Acetate of Ammonia.

Enter in cloth at 100° F., bring to

boil while turning, and turn to shade at that heat.

Toledo Blue O. produces a fine, dark shade of blue. The color does not crock, and is perfectly fast and can be combined with Alizarine Green E B used in recipe 41.

RECIPE NO. 79.

Black on Worsted Yarn.

One-Dip Black No. 2 on 100 pounds worsted yarn.

Prepare dye bath with

15 lbs. One Dip Wool Black. No. 2.
(T. Bairstow & Co., 211 Pearl St., New York.)
2 lbs. Oxalic Acid.
¼ lbs. Sulphuric Acid.

Enter in yarn at boil, and turn 1½ hours at that heat.

The One-Dip Black shown here is dyed very easily and quickly. It is fast against fulling, and will not rub off or bleed in fulling or washing. It dyes very level on the fibre, and will be very valuable for hat or felt dyeing, as it will penetrate the thickest fibre. This dye appears in our recipes Nos. 161 (Nov. 1897) and 9 (Jan. 1898), for a pearl and a slate color, respectively, on worsted yarn. They have been favorably commented upon.

RECIPE NO. 80.

Black on Worsted Yarn.

Acid Black on 100 pounds wool yarn.

Prepare dye bath with.

8 lbs. Acid Black No. 5534.
(Read Holliday & Sons, 100 William St., New York.)
5 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter in yarn at 160° F., bring to boil, and turn to shade at that heat.

A fine, bloomy and full shade is shown here, which will be found to be a very fast, as well as a cheap color. The dye is very soluble, and when combined with acid blues, very fine and cheap shades of blue and blue-black can be obtained. [See recipes 151 (October, 1897) and 164 (Nov. 1897.]

New Dyes.

We give in this issue some new dyes, to which we call the attention of our readers.

In recipe 67 will be seen the use of Iso Diphenyl Black B, sold by John J. Keller & Co., New York, for the production of black on cotton yarn. There are three brands of this dye, used for coloring cotton. They are exceedingly well adapted for union goods, coloring the wool and cotton a uniform black. These blacks, when dyed on cotton, stand acid, and are very useful for cross dyeing purposes, and the shades are not affected by hot ironing. We refer to our dyer's comments.

Wm. J. Matheson & Co., New York, show their Lanafuchine S B, in recipe 69, for the production of a red on worsted yarn. There are two brands of this dye, which possess excellent properties for dyeing pieces as well as yarns. They dye level in acid baths, and yield colors which are fast to light, alkalies and stoving, which do not rub off, and do not change in shade in drying or sponging. This dye does not tint the cotton in mixed goods. It is found of value for wool printing both as a print color and for producing discharge effects.

Orange T A, used in recipe 70, furnished by the New York & Boston Dyewood Co., New York, for producing a dark brown, in connection with Columbia Black F B, is one of the group of substantive coloring matters sold by this house for dyeing cotton in a boiling bath with the addition of Glauber's salt. This dye exhausts well, and colors evenly. This dye, when used alone, produces a red orange shade.

C. Bischoff & Co., New York, show their Toledo Blue O, in recipe 78, for the production of a dark reddish blue on wool cloth. The bath in which this dye is used exhausts entirely, and the color is fast to sunlight and does not crock. It is also fast to washing.

Roundabout Notes.

Horace Koechlin has just died at Rouen, having barely reached his sixtieth year. The last outcome of his fertile brain is a process for improving the fastness of paranitraniline red to light. The fabric is simply passed through dilute nitric acid with or without the addition of a metallic salt. The acid may be cold or warm, and the fabric may be woven or in yarn. Not only does the fastness of the dye benefit by the treatment, but the red becomes sensibly brighter. The process is the subject of a recent French patent.

The B. A. & S. F. are beginning to find out that there is a chance that the trade in natural indigo will probably hold out for another two or three weeks, or perhaps even longer. Their product is indigotin, and natural indigo is indigotin plus something else, and this something else makes all the difference in the world as regards the fastness of the color when dyed on a fabric. It seems a rather clumsy process to use artificial indigotin in your vat, and then put in other things, but it is nevertheless the subject of one of their late patents. There is a big choice of the additional substances, as indigo gluten, albumen, casein, dextrin, starch, turkey-red oil, and gelatine, as well as all kinds of glues and soaps, find places in the list.

The Janus colors from the Hoechst Farbwerke are just now attracting considerable attention. They include yellows, blues, reds, browns and greys. They can be used in dyeing cotton, wool, silk, and other fabrics, and they can be dyed on cotton and wool without mordants. They have thus a wider range than any other known set of dyestuffs, and they appear to be satisfactory on the whole from the point of view of fastness. They are basic azo dyes of various origin.

Dyes are now being prepared by galvanic action, including yellow mordant colors of great fastness and strength. The harnessing of electricity is proceeding apace. It delivers as well as transmits communications, and is bidding fair to supersede steam and horse traction, as well as to make pretty nearly everything. When it can do without the help of the effete old steam-engine, it will become a veritable maid-of-all-work.

A new process of mercerization consists in passing the fabric to be mercerized betwen two rollers, the lower one being hollow and covered with perforations. The alkaline liquid is placed inside this cylinder, and comes into contact with the goods through the perforations. There is thus a steady pressure during the process, due to the weight of the upper roller, and it is claimed for the process that the silky appearance which it imparts to the fibre is not only superior to that obtained in the ordinary way, but that it is not affected by any subsequent bleaching, dyeing, or printing that the fabric may have to undergo.

M. Spica has worked out a process whereby adulteration of sumach with foreign leaves may not only be detected, but estimated quantitatively. The process is based upon the fact that a decoction of sumach when treated with caustic potash and acetate of lead gives a brownish red solution, which becomes wine-red when diluted with water. The details of the practical application of the test are as follows: 5 grams of the suspected leaves are boiled for half an hour with a liter of water. The decoction is made up to a liter with water when cold, and is then filtered. 25 cubic centimetres of this filtrate are now placed in a flask with 5 cubic centimetres of basic lead acetate of 1.184 specific gravity, and 15 cubic centimetres of solution of caustic potash of 1.155 specific gravity. The mixture is well shaken, and then evaporated down to 15 cubic centimetres. If the sumach is pure, the reddish brown solution got in this way is almost perfectly clear, and the presence of any precipitate is a sign that adulteration is present in the sample. The solution

is now diluted to 250 cubic centimetres with water, and the intensity of the color estimated in the usual manner. With pure sumach the tint will be the same as that given by 0.15 grams of safranin to the liter of water, but with an adulterated example it will be weaker. Hence the 250 cubic centimetres should be compared as in Nesslerizing for ammonia, with a solution of safranin of the strength indicated. Microscopic examination is also very useful to any one acquainted with the appearances presented by genuine sumach under the microscope.

One hundred and sixty-eight new dyes were brought out last year, and an analysis of them gives the subjoined results. As regards material, 83 were for cotton (mostly substantive), 66 for wool, 4 for silk, and 15 for mixed goods. As regards color, blue holds the first place with 43 out of the 168, black coming second with 33. The other colors follow in this order: brown, 26; red, 23; violet, 14; yellow, 11; green, 10; orange, 5; and grey, 3. This shows how large the demand is for dark colors. In this connection we may remark that logwood is not yet played out for blacks. In fact, the quantity of it used by dyers keeps on increasing. As regards the birth places of the 168 dyes, Germany claims no less than 131 of them, England, 22; Switzerland 10, and France 5. As regards firms, Bayer and Cassella head the list with 35 dyes each, the average being about nine and a half.

The presence of alpha-naphthol in beta-naphthol can be recognized with certainty by following out a process devised by M. Andre Dubosc. It consists in rubbing up the sample of beta-naphthol with water, filtering, mixing the filtrate with its own bulk of water, and then adding to it two drops of a well shaken solution of five cubic centimetres of bromine in 30 cubic centimetres of soda-lye (36 deg. Be.) and 100 cubic centimetres of water. If the beta-naphthol is pure, the addition of the bromine solution to it will produce a pure yellow color which will disappear on shaking. If, however, alpha-naphthol is present, a permanent dirty violet color is the result.

Fine effects are produced on cotton by printing it first with caustic soda, and then dyeing with a Diamine color, as the places impregnated with the caustic alkali take a deeper color than the rest of the fabric. The soda is mixed with thickening in the usual way, and the dyeing must be done as rapidly as possible.

Two good processes for getting dark coppery blues are as follows: Take 5 per cent. of direct brown, 1 per cent. oxydiamine violet B, and 3 per cent. of common salt. Enter at 60 deg. C. and raise to the boil. After rinsing first in water containing a little hydrochloric acid, and then with pure water, dye with 2 per cent. of naphthindone previously dissolved in twice its weight of acetic acid. After boiling for some time, shut off steam, and add to the same bath 2 per cent. of sumach extract (30 deg.). Finally rinse in water containing ½ per cent. of tartar-emetic. The other process simply consists in substituting 1 per cent. of Diamine Blue Black R for the oxydiamine violet.

Ventilation of Textile Factories.

Abstracts of paper read by W. H. Casmey before the Soci ty of Dyers and Colorists.

The importance of this branch of sanitation is not fully recognized, in fact in many places it is quite ignored. During my experience as a ventilating engineer I have repeatedly gone into factories where probably 500 people have been working, every window and door closed so that no fresh air could possibly enter; the effect on one entering from the fresh air is almost stifling. On occasion I have asked the person in charge, "Why do you keep the rooms closed so much?" and have been answered, "The workpeople complain of draughts if the windows are open, and say if the rooms are warm and close they do not want so much to eat." They are quite

correct in their reasons. Draughts will be felt if the ventilation consists of opening windows only, and the natural inclination for food will be at its minimum when the air breathed is already robbed of some of its life-giving gas (oxygen).

Medical authorities assert that an adult person passes through his lungs 15 cubic ft. of air per hour, and to maintain the standard of purity in the air, this should be multiplied by 250 which gives 3750 cubic ft. per person per hour, and if this volume is reduced, it can only result in reducing the energies of the workers, and thereby the output from each machine. A loom, a spinning, or a winding frame, represents so much capital, and it is the chief aim to make capital earn interest, and from observations I am satisfied that few things would add so much to the prosperity of our country as workrooms and factories well warmed and ventilated.

The importance of fresh air was recognized nearly a hundred years ago in connection with the textile trades, as we see by referring to the Act of Parliament, 1802. The first clause states that openings shall be made through the walls of the mills so as to ensure a good supply of fresh air to the workers. Still, how little has been done comparatively. We see in the cotton cloth factory act of six years ago, that not less than 600 cubic ft. of air per head per hour must be supplied, and a year or two later the same rule came into force for spinning rooms. We however, find that six times 600 cubic ft. are necessary, and in the next legislation on the subject we shall probably find the volume of air not specified; but what is of more importance, the quality which will necessitate about 3000 cubic ft. of air per head per hour being supplied. Manufacturers are beginning to find that ventilating fans are really in the long run economical. One or two who have begun with an 18in fan as an experiment have ended by fitting them in almost every room. For extracting dust, gases, fumes, and hot air they are invaluable. Considering that fans are now very reasonable in cost, and do not require much power to drive them, it seems incredible how ignorant most occupiers are of their use and how reluctant at first to introduce them. The increased activity and healthy look of the workers in a well-ventilated factory must compare favorably with the languid and pallid appearance of those in a close and defective one.

The importance, or I would rather say the necessity, of ventilation from a commercial as well as a sanitary point of view is most apparent, and the question then arises how can the desired ends be attained. I think it is scarcely necessary before practical men to refer much to the so-called automatic ventilation, at any rate a word or two will be sufficient to show its value. 13 cubic ft. of air at 62 degrees weighs one pound; take a room 60ft by 40ft. by 13ft. high, the air in such a room will weigh about one ton. Can we then expect the air to move from such an enclosure without expending some force upon it?

I believe I am correct in stating that the first modern type of fan applied was in connection with a sizing room. Ten or twelve years ago this department was one of the most unhealthy, the walls in winter generally wet with condensation, the air of course being at saturation point, drops falling from the beams often causing the warps to iron mould. The men working under such conditions the day through and then having to walk home, sometimes a mile or more, could scarcely help getting chills, hence the reason why so many old sizers are found with joints twisted out of all natural shape by rheumatism. Now, however, the sizing rooms in many mills are as dry and healthy as any room.

The natural result of the improved conditions being that the men are healthier, the machines can dry over 20 per cent. more yarn in the same time with 10 lb. less steam pressure, and what is technically known as tap-

ing is never found in a well-ventilated sizing room.

The card room is a room where special care is required, as from some cottons a great deal of dust is given off, and unless the fans and inlets are carefully arranged the dust may find its way into the preparing machinery, and thus cause dirty work. As a rule the fans are fixed down one side of the room close to the carding engines, the air being admitted on the other side. The fresh air thus passes over the preparing machinery, carrying any dust away with it and onward over the cards to the fans, where it is discharged to the outside. In some cases, however, the air cannot enter on the opposite side to where the fans are placed. The inlets may then be made on the same side as the fans, but near the tops of the windows, the total area of the inlets being equal to the area of the fans. Many might raise the question: Will this not cause a short circuit of the air? and so it would with a straight-bladed fan, where the suction side is only equal to the discharge side; but in the closed-bladed fan the suction area is two-fifths greater than the discharge, so that the air moves in a semi-circular form, and therefore slowly.

I came across a very interesting case in a card room some years ago that is well worth repeating here. The manager informed me they intended fixing more gas jets, as the hands complained they could not see their work properly. Before the additional lights were added the ventilation was completed, and it was then found not only possible to abandon the idea of more jets but dispense with some of the lights they had. Passing more fresh air through the room cleared away the dust which had hitherto interfered with the rays of light and also supplied more oxygen so that better lights were given.

Coming to the spinning room, careful arrangements are essential to give the required results. We must consider that the workers are most susceptible to draughts, and the same remarks apply to the materials spun. In a spinning room there must be no concentrated currents towards fans and no draughts from doors or windows. The most satisfactory arrangements I have seen are where fans 18in. diameter are used for blowing air into the rooms, the same sized fans being used for exhausting; the first mentioned being run at a slightly higher speed will secure a slight pressure in the room, thus entirely preventing draughts, as the tendency of the air is to escape to the outside through any openings in doors or windows.

In the cotton trade there are a number of firms in England using this double arrangement of fans who claim that many days in the year no artificial humidity is required, the moisture in the atmosphere being quite sufficient for the purpose of spinning, and the same remark applies to weaving sheds.

(To be continued.)

—Perhaps more ingenuity has been exercised in the structure of vesting cloths than in any other type of woven fabric.

—Colors closely allied to, if not identical with, Tyrian purple are still in use amongst certain coast tribes in South America and possibly other coun-

—All children, young persons and women, five or more in number, employed in the same factory, shall be allowed their meal time or meal times at the same hour, except that any children, young persons and women who begin work in such factory at a later hour in the morning than the other children, young persons or women employed therein, may be allowed their meal time or meal times at a different time; but no such children, young persons or women shall be employed during the regular meal hour in tending the machines or doing the work of any other children, young persons or women in addition to their own.—Mass. Statute.

QUESTIONS AND ANSWERS.

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

Four-Harness Twill.

Editor Textile World:

Will you kindly inform us how to work the harnesses in order to weave the enclosed sample?

Kentucky. R. O. C.

The sample sent us is a four-harness twill, two up and two down.

Manufacture of Cotton Rope, Etc.

Editor Textile World:

I desire to post myself regarding the manufacture of cotton rope, twine, sash cord, webbing and yarn, as well as on light textile cotton goods. Will you kindly refer me to some publications upon the same, and give me the names of the best manufacturers of machinery, obliging. W. F. Lane.

If you want technical information as to the processes of manufacture, there are a number of books published on the subject, of which we have sent you a marked list. The best periodical publication, we modestly believe, is the Textile World, and in its Buyer's Index you will find the names of the best manufacturers of machinery. If you have in contemplation engaging in the manufacture of such goods, we should advise you to consult with a competent mill engineer or architect, whose advice at the start would be of the greatest possible value, especially if you know nothing of the business.

Turkish Towels.

Editor Textile World:

Will you please inform me if there is any cotton mill in the South manufacturing Turkish towels, and if it has a selling house in Boston?

New Hampshire. J. H. H.

We know of no such mill.

Mungo and Shoddy.

Editor Textile World:

Will you tell us the scientific difference between mungo and shoddy? We believe mungo is yarn spun from rags, while shoddy is yarn spun from yarn remnants.

New York. S. & E.

Our correspondent's conception of these two articles is not exactly correct. The terms "mungo" and "shoddy" are used in contradistinction more in England than in the United States. The word "mungo" was known in our markets more during the existence of the Wilson tariff bill than before, due to the importation of this material. As a general thing, however, the word "shoddy," in the United States, covers both mungo and shoddy. In England, mungo is understood to mean hard felted rags, usually broadcloths and such like, picked or unravelled, so that it can be used the same as raw wool, while shoddy though it goes through the same operation, is made from soft woven or knitted stuffs, and is of longer, but coarser, staple. Mungo, in England, is mixed with wool, for finer yarns than when shoddy is used. If our correspondent should step into some waste dealer's establishment, they might be able to show him samples of mungo and shoddy, between which he could readily see the difference.

Ingrain Carpet Weaves.

Editor Textile World:

Will you please give me the title of the best work published on the manufacture of ingrain carpet weaves?

Iowa. J. W.

We understand by this inquiry that the best work is wanted relating to the methods of manufacturing ingrain carpets. There is no book devoted exclusively to this subject, but much information can be obtained in any book relating to jacquard weaving. The best book that will cover the wants of our correspondent, as we understand them, is that entitled "Jacquard Weaving and Designing," by T. F. Bell. Price $3.

Book on Spinning.

Editor Textile World:

I have a boy who has been working in a cotton mill, and desires to obtain a good work about yarns and drafts. Can you recommend a work of this kind?

Massachusetts. J. W. F.

The best works for our correspondent's purpose are the following: "Cotton Spinning," by W. S. Taggart; "Students' Cotton Spinning," by Jos. Nasmith. Price $2. There will be several volumes of the former work, two of which have been published taking the subject up to the spinning frame. Price $1.75 per volume.

Knitted Plushes.

Editor Textile World:

I noticed in your April issue, a description of a new style of a knitted plush, in which I am much interested, and would consider it a favor if you would give me the names of parties who are manufacturing it.

New York. J. E. K.

The fabric referred to is a patented one, and we do not know that anyone is manufacturing it at the present time. The patentee is Winslow M. Bell, of New York City, from whom all the necessary information can probably be obtained.

Designs of Olden Times.

Editor Textile World:

I am very much interested in ornamental designing in textile fabrics, and desire to come in contact with the designs that were used in textiles of the 14th, 15th and 16th centuries, and with those of more ancient times.

Massachusetts. L. G. C.

The best place to study designs of this kind is at the Museum of Fine Arts, Boston, where a collection is to be found superior to any in existence, other than in Berlin. Special effort has been made to have this collection useful for just such a purpose as indicated by our correspondent. The collection at the museum is being added to, but is already in a comparative state of perfection, including some thousands of samples of silks, satins, brocades, velvets, linens, laces, embroideries, and other textiles from all quarters of the globe. It has an excellent line of Egyptian or Coptic fabrics. The hand-work of the Turkish provinces, among the primitive people, is especially rich, and in specimens of Spanish, Italian and French weaving of the 14th to the 18th centuries. The samples are mounted on frames, classified and arranged chronologically and by nationalities. We understand that some of these are to be loaned to the Textile school at Lowell, for the use of the students in designing, at that institution.

Straight Warp Knitted Fabric.

Editor Textile World:

I enclose a sample of knit goods. Will you tell me how the fabric is made? I never saw anything like it.

Massachusetts. J. H. P.

The sample referred to is an attractive piece of goods, used for afghans, etc., which evidently was made on one of the straight warp machines, such as the Millar loom or one invented by Busiel, of Lakeport, N. H. We do not know of any of the former machines in operation in this country, but there are at least two of the latter, one at Rockville, Ct., and the other at Methuen, Mass.

Latch Needles.

Editor Textile World:

I am interested in latch-needle work. I would like to get samples of fancy stitches. Can you give me any information on this point?

New York. J. W.

We would refer to our many advertisers who manufacture and deal in latch needles and similar products. There is no published work that will give the information called for.

Method for Keeping Account of Stock.

Editor Textile World:

I wish to get your views as to the best way to follow lots through the mill and estimate the loss in each department, and the time spent on each lot. I have the weight of each department's waste, separately, and have each mix to itself until it reaches the weave-room, where, of course, it loses its individuality. I have thought of some form of ticket to attach to each lot. Can you help me in this respect?

Ohio. R. H. S.

It would be impossible to give a satisfactory answer to this query, as it would consume much more space than can be devoted to it in these columns. We had a series of articles on this subject during the spring of 1894. It is an interesting subject for any writer to take up, and we should be pleased to hear from those who are inclined to favor us with their views, to appear in a series of communications. As a general thing, however, we should say that a person familiar with his duties and the requirements of the mill should be capable of working out a method of his own that would enable him to ascertain what this correspondent requires. Some form of book-keeping would have to be employed, and the use of tickets is resorted to in a large number of mills. Each lot, of course, should be numbered, and there is no good reason why it cannot be kept track of in all the processes to the finished goods.

Size of Cotton Bales.

Editor Textile World:

Can you give me the usual size of a plantation cotton bale?

Connecticut. W. H.

There are various sizes of boxes into which cotton is put in the press, when baled on a plantation. A very common size is 28 inches by 58 inches, for a 500-

pound bale. An effort is being made in Texas, at the present time, to have these dimensions 24 inches wide, 54 inches long, and of a depth sufficient to hold cotton to make a bale of fully 500 pounds. These bales are afterwards compressed to a density of 23 pounds to the cubic foot, but a move is being made in the State named to bring the density to about 40 pounds to the cubic foot.

Sheep in South Africa.

Editor Textile World:

Can you tell me how near to Cape Town, the capital of Good Hope Colony, the sheep ranches of that colony are situated?

Indiana. F. W. P.

The sheep farms, or ranches, of that colony are situated not nearer than 100 miles from Cape Town.

Testing Flue Gases.

Editor Textile World:

I have an apparatus for testing flue gases, and the books on the testing of such gases call for caustic potash, made by the lime process, and not for alcohol. I have tried four drug-stores, and none of them know the kind of potash I need. What should I ask for?

New York. A. B.

There are three kinds of potash now in the market. One is made in France, from the residue left after extracting the sugar and molasses from beets by the beet sugar process. After all the sugar is extracted from the molasses, a residue remaining is made into alcohol from which, by treatment with a solution of lime, is made caustic potash. Another kind is made by a residue from wool treated with lime. These two methods of extracting potash net only about 75 per cent., owing to the amount of impurities which they contain. There is also a caustic potash made by the electrolytic process, or in other words by electrolysis. This is now being made and sent out in powdered form and gives some 90 per cent. efficiency. The latter is probably the potash which you would want to use in the lime you spoke of, and you can obtain the same by calling for electrolitic caustic potash.

Trade Unions.

Editor Textile World:

When were trade unions inaugurated in England?

Conn. G. H.

Trade unions in England were inaugurated during the latter part of the last century, i. e., organized unions came into existence at that time. Previous to then, there were occasional combinations, but no organizations. The woolen trades, tailors, and shoe-makers, with one or two other organizations constituted nearly all of the organized unions previous to the beginning of the present century. At first, all of these associations were unlawful under combination acts of Great Britain. The unions instituted their movement for shorter hours in the forties. A ten-hour bill, so-called, was restricted to women and children. The movements in this direction were supported by public opinion, as more leisure was the inevitable requirement of the labor classes, as the result of an extension of education. These movements were not wholly the work of unions, as long hours were looked upon as contrary to the physical, mental and moral requirements. They were regarded as humane and philanthropic.

Typewriting Machine Ribbons.

Editor Textile World:

Can you refer me to some manufacturer or jobber of typewriting machine ribbons? I should like to obtain a supply of them.

Georgia. J. W. G.

Can any of our readers furnish us with the necessary information?

Exhibition of American Export Goods.

Editor Textile World:

I understand that there is to be an exhibition for the display of American goods, suitable for export, at Philadelphia, within a short time. Can you give me the exact time when this exhibition will be opened?

New Hampshire. E. A. W.

An exhibition of this kind will be opened to the public May 10, 1899, and will remain open for five months, under the auspices of the Commercial Museum, of that city. The purpose of this exhibition is to display the manufactures of this country best suited for the export trade, side by side with samples of European products, with which they must compete in the world's markets. There will be a textile section, showing American piece goods, giving weight, width and pattern most in favor abroad, besides other sections devoted to hardware, electrical devices, machinery, etc. We might state in connection with this, that under the same auspices there will be held an international congress at Philadelphia, in June, 1899.

White Stamping Fluid.

Editor Textile World:

Can you furnish us with a suitable re-

ceipt for making a white stamping fluid to stamp black and tan dyed hosiery.

Lisle.

Our advice is that you procure this white ink or fluid ready made from the manufacturers, for instance, D. L. Witmer & Bro., 5th St., and Germantown Ave., Philadelphia. It costs comparatively little and you are thus assured of the best results and saved from the bother of making it. Some time ago, we published a receipt for this purpose, which was furnished by a knit goods finisher, but our advice would not be to attempt to make it yourself. There are many little accessaries to manufacturing which, of course, can be made by the manufacturer, such as this ink, soap, etc., but with the present low range of prices, we believe that it is economy and good policy for a manufacturer to buy these auxiliaries rather than to attempt to make them in a small way.

Groaning of Engine-Valves.

Editor Textile World:

I am running a 22x24 inch engine with rotary valves and they grunt and groan; sound as if they were dry and cutting, which is not the case as valves and seats are very smooth. Can you suggest a remedy and the cause of the trouble?

Two Rivers, Wis. J. O. V. B.

It is evident that from some cause the lubrication is destroyed. Too much kerosene oil in boilers would affect the lubrication of the valves.

Possibly the quality of oil might be improved or by increasing the amount better results may be obtained.

Would suggest that you try a better grade of oil or more of it. Procure an oil pump and apply a mixture of good quality cylinder oil and graphite.

It is possible that the trouble may be due to water in steam chest which destroys lubrication by being carried to valves in greater or less quantities.

In this case it will be necessary to drain the steam chest with a small drip and either the drip valve opened occasionally or the drain may be operated by a small trap.

Condensers.

Editor Textile World:

Will you please give a description and explain the advantages of a surface and a jet condenser?

Two Rivers, Wis. J. O. V. B.

A surface condenser consists of a chamber or receiver for the exhaust steam through which pass brass tubes carrying the injection water which is supplied usually by a circulating pump.

The steam flowing around these tubes is condensed and removed, together with the air and vapor, by means of an air pump.

A surface condenser is desirable when it is required to use the condensed steam again for boiler feed, allowing the use of salt or impure water for the circulation.

A jet condenser consists of a chamber in which the steam is compelled to pass through a spray or jet of water, the steam, being condensed, falls with the injection water into a hot well, and is pumped out by an air pump.

A jet condenser requires less water than a surface condenser, and is preferable where water of condensation is not to be used in the boiler again.

New Publications.

Yarns and Textile Fabrics; by Dr. J. Herzfeld, translated by Chas. Salter. London: Scott, Greenwood & Co., 19 Ludgate Hill, City, E. C.; price $4.00. This is one of the most valuable textile books that has been published in recent years, and one that should be in the hands of every textile manufacturer and custom house authority. It is an 8-vo. book 9f. of 200 pages, and devoted to the technical tests of yarns and textile fabrics, with reference to official specifications, by the principal of the chemical, technical, experimental and teaching institute, Cologne, formerly instructor at the Royal High School for weaving, Mulheim. It has 69 illustrations. In this work the author has gathered together, probably for the first time, a full collection of the various tests that may at some time or another have to be imposed upon yarns or cloths, and has illustrated those for which mechanical force is employed by typical machines. In it has been collected the tests, both of a physical and chemical nature, that can, for technical purposes, be performed on yarn or cloth, so that not only the commercial and textile chemist, but the practical manufacturer, are catered for. It has an appendix containing the latest official test specifications for army service, which will be useful to those who give their attention to this class of business. The character of the book may be appreciated by a brief reference to its table of contents, in which chapters are devoted to yarn testing, in which the microscope and chemistry act important parts; determining the yarn number and variations from the standard; testing the length of yarns; determining the twist, tensile strength and elasticity; determining the amount of moisture; various methods for testing fabrics for strength, elasticity, shrinkage, etc., etc.

Appleton's Popular Science Monthly, for April. New York: D. Appleton & Co. Yearly subscription $5. This number came out promptly on the first of the month, with an unusually attractive list of subjects for popular reading. Among them may be mentioned the following: An Industrial Object Lesson; The Electric Transmission of Water Power; The Criminal Anthropology in Italy; The Question of Wheat; A Spring Visit to Nassau; A Migration; Principles of Taxation; Evolution and Teleology.

Cassier's Magazine, for April. New York: Cassier's Magazine Co. Price

25 cents. This issue of this well known magazine comes to us with timely articles, as will be noted by the following: The United States Ironclad "Monitor," a new story of the historic vessel and her designer; The Liverpool Overhead Railway and Docks, Liverpool's commercial supremacy and how it is maintained; Trade Unions and Political Economy, teachings of the late British engineering dispute; Crushing and Pulverizing Machines, ancient and modern types; Car Ferrying on American Lakes, a novel method of carrying freight; Inventing for a Living, big fortunes from little inventions; Across the Chilkoot Pass by Wire Cable, the latest application of the cableway.

About Traps. This is the title of a brochure, issued by the W. S. Haines Co., 136 So. Fourth St., Philadelphia, with special reference to the Heintz steam trap, which is highly recommended by those making use of it, as it economizes the expenses of all engines, pumps, steam-pipes, drying machines, etc. With these, it is claimed, that 33 per cent., at least, is saved in the cost of fuel.

Quarterly Journal of Economics, for April, 1898. Published for Harvard University, by George H. Ellis, Boston. This quarterly is just at hand, with a fine list of articles, taking up the economic features of the following subjects: The French Canadians in New England; The Bank Note System of Switzerland; The Objects of Currency Reform in the United States.

Fan Motors. This is the title of a brochure, issued by the General Electric Co., Schenectady, N. Y., showing a convenient means of maintaining a circulation of air, to render the oppressive heat of summer more endurable. This company has manufactured these motors for many years and its product is therefore the result of long practical experience. With its extensive factories subdivided into departments, each for the production of a particular class of work and under the direction of a specialist in his line, the General Electric Company is enabled to produce with equal facility a fan motor of but a few watts capacity or a generator with an output of many thousands of kilowatts—each the most perfect machine of its class.

Power Pumps. This is the title of a pamphlet issued by the Gould Manufacturing Co., Seneca Falls, N. Y., descriptive of Gould's efficient power pumps; triplex for deep open wells; double acting triplex, for light service; and horizontal tank pump.

Draper Looms. The Draper Co., Hopedale, Mass., have issued a four page circular, which they give a title to as "Our Connection with the Art of Weaving," showing that notwithstanding this company did not commence the building of looms until 1894, it has, nevertheless, been intimately connected with the exploiting of some of the most important parts of a loom, for economical weaving. Out of twenty of the more prominent elementary parts of this machine, it has been closely connected with the improvement of eighteen parts, such as the let-off motion, whip roll, harness, lay, reed, temples, take-up motion, shuttle protectors, shuttle guards, filling fork, etc. etc. In all of these the company has been the originator or developer.

Cassier's Magazine, for May, 1898. New York: Cassier's Magazine Co. This number contains timely articles like the following: Johannesburg of Today, with some general notes on the rand, with seventeen illustrations; Wire Ropeways, different types and their uses, with nine illustrations; Nickel Steel Armor in the United States, how it is made and what it costs, with eleven illustrations; Present-Day Shipbuilding Problems, the next great advances in scientific naval architecture; Raising Wrecks in the Thames, the history of a triple wreck, with seven illustrations; Compressed Air in Mining, its advantages over steam and electricity, with six illustrations; A Short Talk on Patents, patent rights in different countries; Types of British Tank Locomotives, their use in passenger and freight traffic, with six illustrations.

Appleton's Popular Science Monthly, for May. New York: D. Appleton & Co. Price $5 per year. This number contains an illustrated article on snow crystals, taken by the aid of the microscope. Hon. David A. Wells continues his series of articles on taxation, taking up the question of the income tax. The advances made in kite flying is interestingly handled. W. C. Ford, Chief of the U. S. Bureau of Statistics, at Washington, has a second article dealing with the wheat question.

Facts and Gossip.

—Connecticut, Willimantic. George K. Nason has been appointed receiver of the Natchaug Silk Co. in place of James L. Hayden deceased.

—Georgia, Atlanta. W. F. Plane of the Plane Coal & Lime Co., West Alabama St., Atlanta, informs us that he is getting information regarding the manufacture of cotton rope, twine, sash cord, webbing and yarn, as well as light cotton goods, and would like to have information regarding machinery for manufacturing same.

—Maryland, Hagerstown. Regarding the new plant of the Blue Ridge Knitting Co., of which S. H. Weihenmayer is proprietor, he informs us that they are now located near the centre of the town and have been running over time since last October.

—Massachusetts, Medford. The Mystic Print & Dye Works, incorporated, has succeeded to the plant formerly owned by John D. Street. The company has a capital of $125,000. President and agent, John D. Street; treasurer, Everett Scammon; superintendent, Richard A. Bryden. As heretofore, they will bleach, dye, print, and finish cotton fabrics.

—New Hampshire, Tilton. The hosiery machinery in the Fay Mills, which have been shut down for two years, has been bought by the Sulloway Mills, Franklin Falls, who will remove the same to their plant.

—South Carolina, Fountain Inn. The following officers have been elected by the stock holders of the Fountain Inn Mfg. Co., which is to operate a new mill here of about 6,000 spindles; J. W. Sheil, president, A. S. Peden, vice president, P. C. Poag, secretary and treasurer.

—Pennsylvania, Williamsport. W. D. Holmes and Mr. Donaldson, silk manufacturers of Paterson, N. J., who have been in correspondence with Samuel Youngman, have been here recently and it is thought that they have decided to locate.

—Province Quebec, Montreal. The Hudson Bay Knitting Co. has been incorporated with a capital of $50,000 by Joseph John Westgate, C. L. Higgins of Montreal, D. W. Higgins, H. E. Higgins of St. Paul and R. Lucas of Lachine.

—Rhode Island, Providence. The Lawton Spinning Co. has been incorporated here, capital stock $55,000. We understand that this is Harold Lawton's company which will operate the J. L. Ross mill which he recently purchased.

Industrial News.

—Stoddard, Haserick, Richards & Co., Boston, Mass., are now the sole agents in the United States, of George Fell & Son, of the Pelican Leather Works, Bolton, England, manufacturers of the widely known brand of Pelican roller leather, which has a very high reputation among English and Continental manufacturers, and in the past few years has been introduced to a considerable extent among the mills spinning the finer counts in this country.

—The Berlin Iron Bridge Company, East Berlin, Conn., have the contract for building a new power house, car barn and steel bridges for the Port Jervis Electric Railway Company, Port Jervis, N. Y. The buildings will be of a very substantial character, entirely fire-proof, covered with the Berlin Iron Bridge Company's patent anti-condensation corrugated iron. The bridges are plate girder type, constructed in a substantial manner for carrying the heaviest loads.

—The Farbenfabriken of Elberfeld Co. have removed to 40 Stone St., from 77 Williams St., New York City.

—Dr. H. Huntington has moved his office into the Wool Exchange Building, 260 West Broadway, New York City, where he has a well-equipped laboratory for his particular line of work, in the examination and testing of materials that enter into the processes of textile manufacturing. Dr. Huntington has been appointed an official chemist of the Wool Exchange, and a great deal of his work is toward the development of waste products. He has done more or less for the leading manufacturers of this country, and his work has proved in all instances, we believe, thoroughly satisfactory.

—The Douglas Mfg. Co., of Fall River, Mass., is open to accept the agency for responsible manufacturers of mill supplies. They have a growing trade in mill circles and while their specialty was originally cop tubes, they have enlarged their line so that it now embraces the general requirements of manufacturers in the way of mill supplies.

—The Norton Mills Company have just completed at Norton, Mass., an extensive plant for purifying wool. The buildings are of a very substantial character, entirely fireproof, and were designed and built by the Berlin Iron Bridge Company, of East Berlin, Conn. The floors throughout the whole plant are of beams and corrugated iron arches, to carry the excessive loads common to warehouse construction. The roofs are of the well known Berlin Iron Bridge Company's patent anti-condensation corrugated iron.

—A new book on "Cotton," which is now in the press, will be published in a few weeks. It is by Director C. P. Brooks, director of the Lowell Textile School, Lowell, Mass., and is an enlargement on the course of lectures that he has given in the school during the past winter. The volume will consist of 350 pages with nearly a hundred full page illustrations and almost as many smaller ones, making one of the best illustrated textile text books that has yet been published.

—The new fire proof roof over one of the boiler houses of the American Sugar Refining Co., Brooklyn, N. Y., consisting of steel trusses, covered with corrugated iron, is being furnished by the Berlin Iron Bridge Co., East Berlin, Conn. The latter company have also just completed at Grand Ave., New Haven, Conn., a steel bridge 427 ft. in length, 52 ft. in width, with one roadway and two sidewalks.

—We are in receipt of an embossed American flag, in colors, from the Standard Machine Co., Philadelphia, which would be an ornament hung up in any office.

—Charles M. Musgrove, of Plainville, Conn., has recently filled an order from the Cooper Manufacturing Co., of Bennington, Vt., for inside and outside brushing attachments for 20 cylinders, and has also received a repeat order from the Valentine Knitting Co., of Bennington. Mr. Musgrove's attachments are winning favor wherever they are tried, and are well worth consideration of interested parties.

—The annual meeting of the stockholders of the Joseph Dixon Crucible Company, Jersey City, N. J., was held April 18, and out of a possible vote of 7345 shares, 7042 shares voted for the re-election of the old board, consisting of Edward F. C. Young, John A. Walker, Daniel T. Hoag, Richard Butler, William Murray, Alexander T. McGill, and Joseph D. Bedle. President E. F. C. Young, Vice-Pres. and Treasurer John A. Walker, and Secretary Geo. E. Long were re-elected by the directors. Judge Joseph D. Bedle was also re-elected as counsel.

—Elsewhere in this issue, may be found the advertisement of J. H. Billington & Co., 113 Chestnut St., Philadelphia, successors to the Danforth Belting Co., of that city. J. H. Billington & Co., of been established since 1848, and it is unnecessary for us to say that their long experience in this line of business enables them to understand the requirements of the users of belting. This firm has come into possession of a well known brand of belting, known as the Danforth belt, which has long been used by the leading manufacturers in this country, and it is the intention to keep up the reputation of this product, and to add to it where possible. This house is prepared to furnish belts for special machinery, speeds, etc. It will also continue and enlarge their department of combing aprons, roller covers, rub aprons, and loom strapping of every description, both from English and domestic stocks, and will continue to supply textile manufacturers with general mill furnishings.

—Charles A. M. Praray, who for many years was connected with the well known firm of mill architects and constructing engineers, C. R. Makepeace & Co., Providence, R. I., has started out for himself,

in connection with William Whittam, Jr., under the firm name of Charles A. M. Praray & Co., with offices in Providence, R. I. and Charlotte, N. C. Mr. Whittam is known to most cotton manufacturers as a practical mill man, of wide experience in England, Brazil and the United States. The firm is prepared to take charge of the designing, erection and complete equipment of all classes of textile and other manufacturing establishments, and is in a position to advise on any contemplated change in the present equipment of a mill, either in the direction of reorganizing of machinery, additions, or new plants.

—We call attention to the advertisement, that appears elsewhere in this issue, of Seth Wilkinson, Pawtucket, R. I., who manufactures silk wipers, for which there is no substitute that is cheaper or more efficient for cleaning all kinds of machinery. These wipers have the peculiar advantage of being of good size, with selvages.

—We desire to call attention to the advertisement in this issue, of the Reliance Machine Works, Cor. Hedge and Brown Sts., Philadelphia, manufacturers of the Reliance hosiery press. These presses have met with much favor wherever they have been used.

—The Mutual Boiler Insurance Company, Boston, Mass., has in press a report by its engineer, R. S. Hale, on the value of the different steam coals used in New England. The comparison of pea and buckwheat coal will be of interest to many of our readers. Mr. Hale's figures show that pea coal will make about three (3) per cent. more steam per pound of coal than buckwheat coal, and needs about 15 per cent. less draft. Therefore, if a boiler plant has more draft than it needs, it can afford to pay only three (3) per cent. (nine cents per ton if the coal costs $3.00) more for pea coal than for buckwheat. If however, the plant is pushed and needs all the draft it has, it may be worth while to pay a high price for a good coal in order to keep up steam. In such cases artificial draft or a new chimney would often pay for itself by allowing the use of a cheap coal.

—William J. Matheson & Co., Ltd. announce their removal of their New York office from 178 Front St., to their new offices and ware house, 182 and 184 Front St., corner Berling Slip.

Appleton Mills Stock.

The directors of the Appleton Mills, Lowell, Mass., have sold by auction 2250 shares of the company's capital stock. Under the plan of reorganization the capital stock was reduced from $600,000 (par $1000) to $150,000 (par $100), and $300,000 new stock issued, making total $450,000. Former stockholders were given until April 1 to subscribe for the 3000 new shares at a ratio of two new for one of the old. The 2250 shares sold by auction, on April 13, represented the shares not subscribed for by stockholders. The reorganization syndicate behind Treasurer Cumnock agreed to take this stock, but the public were permitted to buy it at a price not less than $100 per share. The stock that remained unsold after the auction was sold to the syndicate.

Ironphalt Roofing.

The Armitage Manufacturing Co., Richmond, Va., whose advertisement appears on page 175, have got out a valuable material for the permanent covering of all kinds of buildings, all ready for application. It is composed of two layers of wool felt saturated with a composition of asphaltum, cemented together with a layer of burlap canvas in the centre, the whole fabric passing under hydraulic pressure, causing it to be a compact sheet of water proof roofing, the surface of which is covered with a soft composition, into which is imbedded iron-pyrites, free from sulphuric acid. In color it is a rich brown, making a portable roofing, ready for use. It is both fire and water proof, as the roofing surface is covered with iron. It virtually makes an iron roof, thereby securing the insurance risk the same as on metal or slate roofs. While it cost more money than the ordinary cheap grades of composition roofing that are flooding the market, it is far preferable even at the advance price, on permanent buildings. The company requests all who contemplate using roofing to write them for samples before buying and compare their samples with other grades. They have large contracts on hand and can furnish testimonials and photographs of some of the largest manufacturing plants in this country. The company anticipates 50 per cent. more business this year than in 1897.

Renewing Lamps.

A summary of the business of the Lynn Incandescent Lamp Company, Lynn, Mass., shows that nine out of ten of their shipments are to old customers and that to five out of eight are to lighting stations. This would seem to demonstrate that station managers are appreciating their efforts to furnish them with a good lamp at reduced cost and that they are making it possible and profitable for the station manager to use a lamp of a higher efficiency and to replace them oftener. The nice bright clear light of a higher efficiency lamp is certainly most satisfactory to the user. The renewal of incandescent lamps plays an important part in the economy of station practice.

Fire Extinguishers.

The Utica Extinguisher Co., 48 Liberty St., Utica, N. Y., whose fire extinguisher is illustrated in the April issue of the Textile World, has recently received a very strong endorsement of its extinguisher from the superintendent of public buildings in the state of New York as follows:

"We have equipped the State Capitol Building, Executive Mansion, State Hall and Geological Hall with your hand Chemical Fire Extinguishers, believing them to be the most reliable, most easily operated and most attractive extinguisher that has been brought to our attention."

This extinguisher has also been installed in many textile establishments to the utmost satisfaction.

General Electric Company.

The General Electric Company in view of the constantly growing demand for

apparatus of its manufacture, has decided to make a large increase in its manufacturing facilities. March 25th the company placed contracts for the construction at its Schenectady works, of a new foundry which will be one of the largest in this country. The present foundry has been for some time entirely inadequate to meet the demands upon it, and considerable work has been passed on to the admirably equipped foundry which the company has at Lynn. The work to be done has, however, grown even beyond the capacity of both the Lynn and Schenectady foundries, working overtime and all is now to be concentrated in the new foundry, construction of which is to be begun immediately.

The building will be of brick, 500 ft. long and 140 ft. wide with an "L" 100 ft. by 120 ft. The latter will be used as a cleaning shop. Besides these main buildings a number of sand sheds, several smaller buildings for the storage of foundry material, and a new pattern store house 200 ft. long 60 ft. wide and two stories high, will also be erected. All combined, the floor space occupied will be about 12,000 sq. ft. Plans are also under consideration for a new machine shop, 650 ft. long by 165 ft. wide, but the appropriation for this has not yet been authorized.

The buildings will be erected on the property which the General Electric Company recently purchased from the Gilbert Car Works. It lies to the west of the present works and parallel with the Erie canal. The foundry will be built several hundred feet from the canal and will have in close proximity the sand sheds and pattern store house. Every precaution will be taken to eliminate risk from fire; indeed the pattern storehouse will be made as absolutely fireproof as possible. The foundry as laid out, will be a model of the most approved modern practice. Careful thought and study have been given to the matter, and the engineers of the company have drawn on the experience of other companies which have recently constructed foundries. The building will be of imposing proportions, and will be in plain view from the New York Central tracks.

The contemplated machine shop will be devoted almost entirely to very large machine work. The size of the great generators which the General Electric Company have been manufacturing, has of late been increasing until, today, a generator of 4000 h. p. is not now regarded as of unusual size. In fact, generators of 5000 h. p. are now in course of design, and the demand upon the shop in which the large machinery has heretofore been built has far outgrown its present proportions.

The middle aisle of the new machine shop will be 65 feet wide, with narrower aisles down each side. Electric travelling cranes will be installed to operate along each aisle and a gallery will be built along one side only. All the large machine tools will be removed from their present locations to the new shop, their places being taken by smaller apparatus. The total floor space of this building will amount to not less than 144,250 sq. ft.

Silk Association of America.

The following officers were elected at the late regular annual meeting of the Silk Association of America, held in New York City:

Albert Tilt, president; Catholina Lambert, 1st vice-president; William Strange, 2d vice-president; Jacques Huber, 3d vice-president; Franklin Allen, secretary; Charles F. Homer, treasurer. Directors: John N. Stearns, Geo. L. Montgomery, William T. Ryle, Jerome C. Read, William Skinner, C. L. Auger, M. M. Belding, Dwight Ashley, Joseph Loth, John H. Hopper, A. G. Jennings, H. W. Boettger, Jacob Weidman, Frank W. Cheney, W. E. Eaton, B. A. Armstrong, James M. Erskine.

Dutch Patents.

The attention of our readers is directed to the advertisement of H. Massink of Amsterdam, Holland, as a reliable attorney for procuring patents and trade marks abroad especially in Holland and the Continent. Most American inventors, especially of textile devices, wish to protect themselves in foreign countries as well as in the United States, and while American attorneys are usually able to give information on this matter, it might sometimes be a matter of convenience to know of a responsible person abroad to whom such matters can be entrusted or from whom information can be obtained.

April Sales of Mill Shares.

	Lowest.	Highest.
Pacific	1850	1850
Cocheco	175	177
Manchester	100	100⅝
Lancaster	272½	290
Appleton	100	100
Boott	840	850
Merrimack	915	927½
Naumkeag	47	50
Lyman	50¾	54¾
York	537	550
Hargreaves	97½	97½
Border	105	105
Massachusetts	78½	78¾
Tremont & Suffolk	125¼	125¼
Union	137½	137½
Great Falls	131⅛	131⅛
Stark	800	815
Middlesex	115¼	115¼
Bates	97¾	99
Pepperell	1125	1125
Androscoggin	93¼	93¼
Lowell Mfg. Co.	495	495
Hamilton	637½	637½
Dwight	760	767½
Franklin	98	98
Lawrence	102¼	102¼

—New York, Cohoes. The Coronet Knitting Mills, capital $15,000, recently incorporated is the re-organization of the $15,000, is the re-organization of the Royal Knitting Mills. President and superintendent, Silas Owen; treasurer, A. W. Scott; selling agents, S. Hazard Halstead. They employ 50 hands and operate 23 knitting machines, making ladies' and children's novelty knit goods.

—North Carolina, Winston. Fries & Co. have established a large water power plant on the Yadkin River 15 miles from Winston. The company will be known as the Friese Power & Manufacturing Co., and will furnish power to several new mills at Winston, Salem, Mayodan, and elsewhere. This is said to be the largest undertaking of its kind in the South.

—New York College Point. The Jeannette Silk Mills at this place, which have been under the management of Samuel Kunz, have been sold to Charles Brandis of Paterson, N. J.

MILL NEWS.

Cotton.

New Mills.

—Arkansas, Little Rock. The Thomas Mfg. Co., a new company, has awarded contract to George Liefer for its new cotton mill building. This company has bought the machinery of the old Quapah and will also buy some new equipment. Dr. A. D. Thomas is president of the company, capital stock of which is $100,000.

—Georgia, Molena. Brooks Bros. & Co., of Toledo, Ga., are considering the establishment of a cotton mill at this place and also a cotton seed oil mill.

—*North Carolina, Albermarle. C. A. Shankle informs us that the cotton mill proposed for this place would have been an assured thing by this time had it not been for the war agitation. They had $30,000 subscribed, but we understand that the matter is not being pushed forward at present.

—*North Carolina, Albermarle. Contract for the new cotton mill of the Wiscasset Cotton Co. at this place has been let to Brown & Bro., of Concord, N. C., and work has been started.

—North Carolina, Monroe. J. E. Stark and others are interested in a new cotton mill for this place, capital to be about $100,000, of which $50,000 is reported as having been subscribed.

—*North Carolina, Norwood. The new cotton mill here will be known as the Norwood Cotton Mills. The following officers have been elected: D. B. Coltrane, of Concord, N. C., president; Dr. J. A. Tyson, of Norwood, secretary and treasurer. The company will have a capital of $50,000 with privilege of increasing to $200,000, and a call for the first assessment has been made. It is expected that work on the building will be started very soon.

—*South Carolina, Greer Depot. The Brooks Mfg. Co., recently organized here to operate a cotton batting mill, has a capital stock of $5,000, and the incorporators are E. R. Brooks, E. S. Brooks, L. J. Green, L. P. Moore, and J. A. Robinson.

—South Carolina, Spartanburg. Edward McMullen is leading promoter of a new cotton mill here to make hosiery yarn. It is expected that plant will be built in time to start up next fall.

—Tennessee, Chattanooga. A company has been organized with $100,000 capital by E. R. Richmond, J. A. Campbell and others to build a cotton mill at this place. Location will probably be at Alton Park. This is entirely distinct from the Vance & Kirby mill.

—Tennessee, Chattanooga. The Vance & Kirby Cotton Mill Co. will build a mill here at once putting in 6000 spindles at the start, and the mill will be large enough to accommodate 10,000 spindles.

—*Tennessee, Elizabethton. The Tennessee Cotton Mills will probably start up about May 1st. This is a new mill, which will make yarn for the Tennessee Line & Twine Co., of which M. E. Clark is general manager. The new company has 1800 spindles, with a capacity of 9000 lbs. per week. The officers of the company are pres., L. A. Briggs, Ashaway, R. I.; vice pres., L. Godfrey, Providence; sec. and treas., F. Hill, Ashaway; gen'l manager, M. E. Clark, Elizabethton.

—*Texas, Daingerfield. Regarding the proposed cotton mill here, J. L. Williams informs us that plans have not yet been formulated. They want to build a 3,000 spindle mill, and would like to secure second hand machinery in good condition to make duck, brown domestic, etc. Some of the interested parties are J. Y. Bradfield, R. M. Traylor, J. C. Jenkins, J. H. Smith, H. M. Williams, J. M. Moore, W. T. Connor, Jr., and others.

Enlargements and Improvements.

—Alabama, Florence. The Cherry Cotton Mills will put in $15,000 worth of new machinery, most of which has already arrived, and is now being installed. They have just completed putting in automatic sprinklers in their warehouse.

—Georgia, Trion. The Trion Factory has been equipped with gravity spindles replacing 3840 common spindles. A new warehouse has also been built.

—Massachusetts, Williamstown. The Williamstown Mfg. Co. will have a new Cooper-Corliss engine put in next month, and are having foundation for it laid now. It will be of compound type with capacity of 800 h. p., but for the present only ½ the machine will be put in, provision being made for compounding later.

—North Carolina, Burlington. The Oneida Mill, one of the mills of Holt Bros., large cotton manufacturers, will be enlarged and more operatives employed.

—*North Carolina, Fayetteville. The addition to the mill of the Holt, Williamson Mfg. Co., will give them a total of 5,000 spindles. They use steam power, and will employ about 75 hands. Capital stock is $60,000. Walter L. Holt president, E. H. Williamson, treasurer and agent.

—North Carolina, McAdensville. The McAden Mfg. Co. are having plans prepared for a new mill by Architect Geo. E. Ladshaw of Spartanburg, S. C.

—Province of Quebec, Valleyfield. The Montreal Cotton Co. has made satisfactory arangements with the town regarding taxation, and will not remove its plant. A new mill will be added, and it is reported that Manager Louis Simpson has sailed for England to buy machinery.

—Rhode Island, Westerly. William Clark Co. is building an extension to its bleachery and dye house, which will be used as a lustre room and the manufacture of a raw product silk, for which the company commands exclusive rights.

—*South Carolina, Bamburg. We now understand that the issue of $40,000 in bonds by the Bamburg Cotton Mills is to provide for an additional mill, which will about double the capacity of the plant. The company has a reserve fund of $10,000, which will be also used in this addition.

—South Carolina, Cowpens. The Cowpens Cotton Mills have added 18 revolving flat cards and 3,000 spindles, and it is reported that 150 looms may be put in soon. This gives them a total of 10,000 spindles.

—*Virginia, Lynchburg. At the stockholders' meeting, March 25, it was voted that the directors make arrangements for the enlargement of the mill, as soon as advisable. This enlargement was mentioned recently. Max Guggenheimer is president of the company. The capacity will be increased from 21,500 spindles to 40,000 spindles, and from 725 looms to 400 looms. C. R. Makepiece & Co., Providence, will make the plans.

Mills Starting Up.

—Maine, Vinalhaven. L. C. Chase Co. has moved into its new net factory at this place.

—*New Jersey, Paterson. Robert Franklin Adams, son of Robert Adams of the old firm of R. & H. Adams, has now made arrangements with the Paterson Saving Institution, which will enable him to start the Essex Mill on Mill St., in a few weeks. About 200 operators will be employed. Fine cotton yarns will be made.

—North Carolina, Fayetteville. The Green Hill Cotton Mill, which has been idle for several years, has been purchased by E. C. Foy of Mount Airy, N. C. Equipment consists of 1500 spindles and 35 looms, which are comparatively new. Work will probably be started soon.

—*South Carolina, Rock Hill. A charter has been granted to the Victoria Cotton Mills, capital stock $75,000, which will operate the Globe Cotton Mill at this place, recently mentioned as bought by J. R. London and others for $40,000. The incorporators are W. L. Roddey, A. Freidham, A. F. Ruff, R. T. Fewell, A. E. Smith.

—*North Carolina, Manchester. J. R. Williams of Fayetteville, N. C. and A. M. Fairley of Tarboro, N. C., who recently bought the Manchester Mills, will operate the same under the name of the Murchison Cotton Mills, making warps and yarns.

—*Pennsylvania, Chester. The new lace curtain mill of T. I. Birkin & Co., which has been moved from Philadelphia, has been started.

Mills Shutting Down.

—Massachusetts, Millbury. The Millhands, will shut down April 30th for an bury Cotton Co., employing about 200 indefinite time.

—Massachusetts, West Boylston. The Holbrook Mills, of F. H. Rice & Co., shut down their spinning department last week. This plant will be demolished owing to the Metropolitan Water Works system.

—New Hampshire, Manchester. Notice has been posted at the Manchester Mill that, with the exception of the print works, all departments will be stopped one week beginning May 2nd, and every week thereafter until further notice.

—Pensylvania, Chester. Judgment has been executed against the Paterson Mills Co. by the Delaware County National Bank, of Chester for several thousand dollars. The mills, which employ 300 hands, on cotton goods, have been shut down.

—Rhode Island, Allentown. The Rodman Mfg. Co.'s mills have shut down for about eight weeks, owing to dull business, which puts about 500 hands out of work.

Woolen.

New Mills.

—Illinois, Chicago. It is reported that the Armour Co. will erect a large wool and felt mill to cost $100,000 and employ 500 hands, to be located in Chicago.

—*Maine, Oldtown. It now looks as if a new woolen mill would be established here. It is reported that the stock has nearly all been subscribed. T. W. Beattie and J. B. Beattie of Oldtown, who are at present connected with the Oldtown Woolen Co., are interested. The intention is to build the mill on property of the Bodwell Water Power Co. just below the Oldtown Woolen Mill. At the start equipment will probably be for a 4 set plant.

—*Maine, Phillips. Hescock & Atwood, whose woolen mill was burned March 7th, now expect to form a stock company and rebuild on the old site.

—Maine, Skowhegan. A new woolen mill is being talked of for this place. The projectors desire that the town should raise $18,000 for a mill, which they would lease for 10 years at a rental of $900 a year. At the end of that time building would be bought by the company. In addition to this plant would be free from taxation and $15,000 in stock is wanted.

—*Maine, Plymouth. B. Robinson and U. G. Lamb, who have formed partnership under the name of Robinson & Lamb, have informed us that they expect to start their plant in Plymouth May 1st. They will do custom carding and make satinets, cotton and wool flannels and hosiery yarn. The plant will have three sets cards and two looms, and use both steam and water power.

—*Massachusetts, Lawrence. The Hampshire Worsted Co., which is a new firm, has a capital of $4500. Jacob C. Nash is treasurer and E. S. Creamer, agent. They will run one room containing 3,000 sq. ft. in Samuel Smith's new building on Essex St., and will start up 8 broad looms May 1st on men's wear worsted suitings. They will buy both cotton and worsted yarns, grey and colors.

—*Masachusetts, Worcester. The Beaver Brook Mfg. Co., 548 Park Ave., Worcester, Mass. started in its new building April 12, operating one set of cards, 16 looms, employing 25 hands, on satinets. This company is made up at present of F. N. Hall and H. A. Hall. Their capital is now $10,000. Steam power is used.

—*Michigan, Sault Ste. Marie. We now understand that G. J. Griffith, Pickford, Mich., has let contract for his new woolen mill to Isaac Watson, and expects to have the mill in operation before July. The building will be 24x60, to be used for custom work mostly.

—*Pennsylvania, Apollo. The Board of Trade has rewarded contract to C. Hilty for the new woolen mill to be built there.

—*Pennsylvania, Langhorne. The contract for the mill of Frederick Rumf &

Son has been let to George C. Deitrich, 927 North 7th St., Philadelphia. The building will be 40x350, two stories, brick and iron. Product will be woolen goods. Cost of building about $40,000. Steam power. J. F. Stuckert & Son, Philadelphia, are the architects.

—*Pennsylvania, Taylor. The Taylor Worsted Mills have completed their organization, electing the following officers: president, P. Mulherin; secretary, J. P. Law; treasurer, M. C. Judge. Their building is 75x125. It is expected that work will be started on men's suitings by the middle of May.

Enlargements and Improvements.

—Kentucky, Mayfield. The Mayfield Woolen Mills have ordered 3 sets of cards, 26 broad looms, 30 narrow looms, and 1292 spindles, which will double its plant. Architects Hales & Ballinger, Philadelphia have prepared plans which include four new brick buildings.

—*Maine, Dexter. Amos Abbott & Co. inform us that their new addition will be completed in the fall, and will contain two sets of new cards, 16 new looms, giving them a total of six sets and 56 looms. As recently reported, Archts. Lockwood, Greene & Co., Boston, will supervise the work, which will be started shortly.

—*Maine, Dexter. It is now reported that Amos Abbott & Co. are having plans prepared by Architects Lockwood, Greene & Co., Boston, for a new building 56x104, 3 stories.

—*Maine Dexter. Morrison Bros., who are to operate the White Mill of the Old Dexter Woolen Co., have had work started on a building 37x48, one story, to be used as a dyeing and wool washing department. Probably it will be early in June before this mill is started up.

—Maine, No. Monmouth. J. H. McIlroy, proprietor of the Annabescook Mills, is having plans prepared by architects Coburn & Sons, for a new building.

—*Maine, North Monmouth. J. H. McIlroy, Supt., Annebescook Mills, informs us that they are simply contemplating an addition to the present structure, and can give no further particulars at present.

—Maine, Sanford. We understand that the Sanford Mills are building a large addition.

—*Maine, Sanford. The Sanford Mills inform us that their addition is a comparatively small one to give more room for finishing.

—Massachusetts, Ballardvale. The Ballardvale Mills have started work on a small addition to their plant.

—*Massachusetts, East Brookfield. E. G. Gibson confirms our report that he has purchased the factory until recently occupied by R. P. Grant. He will build a boiler and engine room, having started the foundation March 21st, and expects to have same completed by May 1st. He will put in a new 100 H. P. Slater engine. Will have dye house, and this plant will employ about 10 men.

—*Massachusetts, Hampden. John Kenworthy, manufacturer of kersey cloth and horse blankets, has made a number of improvements at his plant, putting in a new engine, pump and heater, and attached Bramwell & Apperly Feeds and Barker Rubbers to cards, and replaced old spinning machinery with five Johnson & Bassett jacks, which gives greatly increased capacity. He has now under construction a basement under main mill, which will serve as engine and finishing rooms. He also has just put in the Smith patent automatic fire alarm system throughout the entire plant.

—Massachusetts, Leominster. The Leominster Worsted Co. is enlarging its plant, by the addition of 1500 square feet of floor space. The addition includes a weaving, spinning and dressing room, at the west of the factory. A Heathcote dryer will also be put in.

—Massachusetts, Monson. D. W. Ellis & Son will build a new dyehouse and put in a new water wheel, these improve-

—Massachusetts, North Adams. The ments to be completed soon after May 1. Dunbar Mills Co. is putting in 25 Crompton & Knowles woolen looms.

—*Massachusetts, North Chelmsford. Work was started on an addition to the mill of George C. Moore at this place on April 1st, as previously mentioned. Mr. Moore expects to have this addition running about Sept. 1st on worsted yarns No. 16 to 40. This will give him a total of 10 worsted combs and 10,000 worsted spindles. John Connor is supperintendent.

—*Pennsylvania, Darby. Verlenden Bros., proprietors of the Imperial Mills, will soon put their new addition in operation. Building is 90x60, 3 stories brick. They will also put in a new 350 H. P. engine, which has been ordered.

—*Pennsylvania, Mount Joy. The additions recently mentioned to the woolen mill of George Brown & Sons, will consist of a new building, which they expect to operate by May first, employing about 50 hands. They will put in 56 new looms and one set of cards, making their total capacity 178 looms and five sets of cards. They use steam power and have a dyehouse.

—Pennsylvania, Philadelphia. Collins & Aikman Co., plush manufacturers, are enlarging their mills on Nixon St., above Fountain, by erecting a new three story building 75 feet long.

—Pennsylvania, Philadelphia. Thomas Canes & Sons, carpet manufacturers, have just taken the spinning and carding departments of the Canton Mills, Manayunk, which have been idle for some time, and are fitting them up with new machinery.

—Vermont, Saxton's River. The Saxton's River Worsted Co., successors to Alexander Smith Co., have received 10 new looms, which will be at once set up.

Mills Starting Up.

—*Maine, Dexter. The company, which will operate the Stone Mill, formerly of the Dexter Woolen Co., has now completed its organization. The name is the Penobscot Woolen Co. Capital stock $100,000. President, S. S. Ireland; treasurer, W. H. Abbott; clerk, Wesley H. Judkins; board of directors, O. F. Ireland, Walter Scott, S. S. Ireland, Job Abbott, W. H. Abbott. It is expected that O. F. Ireland will be superintendent. A new water wheel will be put in soon and work begun early in the summer. The plant contains 3 sets of cards and 38 broad looms.

—*Massachusetts, Clinton. The new Sterling Worsted Co. now expects to start operations May 15th.

—Massachusetts, Millbury. The Atlantic Mills on Main Street, have been leased by Moses Thompson, who will soon begin the manufacture of satinettes.

—*Massachusetts, North Adams. Strong Hewat & Co., recently mentioned as to operate the S. W. Barker Mills, at Briggsville, inform us that they expect to start the plant next August, employing 150 hands. Product to be cheviots, tweeds, fine cassimeres, overcoatings, ulsterings, etc. They will add new scouring and finishing machinery. The mill has 8 sets woolen cards and 40 looms. The company has $150,000 capital. President, R. A. Strong; treasurer, E. H. Farnsworth; agent, R. A. J. Hewat. Goods will be sold direct.

—New York, Moffittsville. R. L. Main has leased the Moffittsville wool and carding mill, owned by G. W. Goodsell, formerly operated by J. M. Taylor. He expects to start work about May 1.

—*Pennsylvania, Chester. David Armitage & Son have started up their mill in the old Yarnall Mill. This is an English company, in which R. E. Ross, of Chester, is also interested.

—Pennsylvania, Philadelphia. The mill of William Clegg & Son, at West Manayunk, which has been shut down for several years, is to be started up shortly on cassimere. New machinery has been put in to make carpet yarns. About 50 hands will be employed.

—Pennsylvania, Philadelphia. Rudolph Blankinburg & Co. have purchased the Lincoln Mills, Main St., Manayunk formerly owned by the late David Wallace and James Wallace. The mills have been idle several years. It is understood that the purchasers will fit them up for woolen manufacturing, soon.

—Utah, Springville. James Whitehead, Jr., has started his woolen mill for the spring and summer run. He now has 11 knitting machines. T. C. Miller is superintendent.

—Wisconsin, Monticello. The Monticello Woolen Mills have started up, after several months of idleness.

Mills Shutting Down.

—Massachusetts, Boston. The Roxbury Carpet Co. has shut down its mill in Roxbury, owing to dull business. This puts about 700 hands out of employment. It is not stated when the mills will be started.

—Massachusetts, Saxonville. The Saxonville Mills, which make yarn for the Roxbury Cotton Mills, at Roxbury, Mass. have shut down for a indefinite period. This throws 200 operatives out of employment.

Knit.

New Mills.

—California, Eureka. C. V. Jackson & Co., who now conduct a laundry at this place, have under consideration the question of engaging in the manufacture of underwear, and have as yet made no arrangements, but are seeking information.

—*Georgia, Hampton. The new knitting mill here will probably be known as the Henderson Knitting Mill. A new building will be put up, and the plant ready to start August or September next, employing 15 to 20 hands, making ladies' underwear, both light and heavy weights. They will have eight knitting machines, besides trimmers, and will use steam power. A. J. Henderson is the sole proprietor, and will put in $100,000. The knitting machinery has been ordered, and will be shipped probably in June.

—*New York, Cohoes. The No. 1 Mill of the Victor Knitting Mills, recently destroyed by fire, will probably be rebuilt as soon as the insurance is adjusted. Work is now in progress clearing away the ruins. Some of the machinery in Mill No. 2 was not damaged to any extent, and is being moved to Mill No. 3, where it will be operated.

—North Carolina, Flat Rock. A new company, to be known as the Hart Mfg. Co., will operate on a large scale, the knitting plant, employing 250 operatives. The product will be hosiery. Capital stock, $50,000. Dr. Guerard is president, and P. W. Hart, secretary and treasurer. Work on the mill is to be started at once.

—*Pennsylvania, Huntingdon. We note a report that H. E. Funk, of Hummelstown is to operate a hosiery factory at this place. He has sold his plant at Hummelstown.

—*Pensylvania, Lititz. The new knitting mill, to be operated by H. S. Kauffman and F. W. Briggs, will be known as the Lititz Springs Knitting Mills. They will put up a new building, and expect to start up June 1, employing 20 hands, making ladies' underwear. A gasolene engine will be used, and eight knitting machines employed. They will not do their own dyeing. The machinery has been bought.

—*Pennsylvania, Marysville. The Marysville Hosiery Co., recently incorporated, has a capital of $3,000. Incorporators are John M. Beers, Marysville; Harry M. Homer, Carlisle; Benj. F. Umberger, Harrisburg; H. E. Hess, S. G. Geib, Marysville.

Enlargements and Improvements.

—Massachusetts, Spencer. The Massasoit Knitting Co., now operating 8 machines, will put in several new machines and employ more hands. R. O. Holden is manager.

—*New York, Kinderhook. Curtis F. Hoag, proprietor Lindenwald Knittting Mill, confirms our recent report regarding his enlargement, and states that he expects to have his addition completed about May 1st. He will employ 10 to 15 more hands, and put in 6 or 8 knitting machines, also a new boiler and engine. His total equipment will be then 75 knitting machines.

—New York, Oswego. John H. Quirk will enlarge the capacity of his plant at the corner of Water and Seneca Sts., having placed orders for knitting machines. The building that joins his present plant has been leased, and will probably be remodeled. He will then employ about 50 more hands.

—*New York, Syracuse. The Clifton Knitting Co. confirms our recent report and adds that they have leased a comparatively new building on Wyoming St., which will give them double the room of old plant, and they will materially increase their production, employing 150

hands and operating 96 knitting machines, some of which will be new. They use steam power and make ladies' and misses' underwear.

—North Carolina, Lynn. L. N. Wilcox & Sons are building an addition to their knitting mill to be used as a finishing department.

—Ontario, Almonte. The Almonte Knitting Co. is to build a new bleach house and will enlarge its dye house.

—*Pennsylvania, Danville. The Danville Knitting Mills Co. have let contract to Trumbower & Werkheiser for the addition to their knitting mill here, previously mentioned. W. Joseph Harrison is superintendent. 100 new knitting machines will be put in. The bid for the building was $8050. Work will be started at once.

—Pennsylvania, Reading. The Reading Knitting Mills, cor Fourth and Elm Sts., now operated by Gaenzle and Leippe, are to put in 254 Scott & Williams automatic knitting machines, which will about double the capacity of the plant.

—Pennsylvania, Souderton. M. B. Bergey & Co. are to have a new building put up for them, 35x60, two story basement. They will occupy the lower floor in basement. Their present equipment is 75 knitting machines.

—South Carolina, Jonesville. The Jonesville Knitting Mills write us regarding their enlargement that they expect tn add 20 knitting machines with auxiliary machinery, four of which will be put in at once. This company has a capital of $10,000. Pres. and treas., R. A. Whitlock; supt., W. E. Alman; selling agents, Bacon & Co.

Mills Starting Up.

—New York, Auburn. James Holroyd has started up his knitting mill, at the corner of Lake and Hudson Avenues, which has been idle for nearly ten months.

—*Pennsylvania, Mahanoy City. The Eagle Hoisery Mill, Jones & Johnson, proprietors, has been rebuilt and new machinery has been installed. Probably start will be made soon.

Silk.

New Mills.

—New Jersey, Paterson. Cardinal & Becker, manufacturers of broad silk dress goods, Fulton St., contemplate an annex to their Paterson business in some Pennsylvania town. They have made no decision as yet where they will locate, and will correspond with the Boards of Trade of such places as are desirous of such an enterprise, with a view to ascertaining advantages, inducements, etc.

—*New York, Delhi. Plans for the new mill of Gallant Bros., Paterson, N. J., who are located here, have been prepared by architect Franklin Van Winkle, 120 Liberty St., New York. The mill will be of brick and stone, one story, 100x150, with a glass roof. Two 150 h. p. boilers and one 150 h. p. engine will be put in, occupying a separate building. In addition to this, a two-story building for spinning and warping will be built, 160x55.

—*Pennsylvania, Coatesville. Ashley & Bailey, who operate silk mills at Paterson, N. J. and Columbia and Marietta, Pa., have had work started on their new mill at this place located on Strode Ave. The building will be 300x52, and will employ 500 operators.

—Pennsylvania, Hazelton. F. W. Fulton & Co. (silk manufacturers) Paterson, N. J., will doubtless locate at this place. They would employ over 100 hands.

—Pennsylvania, Shamokin. The Vega Silk Co., of Paterson, N. J., is the company which is to locate at this place. It will occupy a 4 story brick and iron building 50x150, to be erected by a stock company at a cost of $70,000, of which Judge Savidge, of Sunbury, Pa., is the head. They now operate 60 looms in Paterson, but we understand that the new mill will contain about 200 looms.

—*Pennsylvania, Williamsport. Later information regarding the new silk mills, states that the mills will be called Lycoming Silk Mills, and we understand that W. D. Holmes has definitely decided to locate here.

—Rhode Island, Woonsocket. The Ballou Mill, on So. Main St., which has been idle for the past six months, has been bought by a company which was recently incorporated at Portland, Me., known as the Magid Hope Silk Mfg. Co Capital stock, $300,000, with the following officers: President, Louis B. Magid, Boston; treasurer, Edgar K. Ray, Woonsocket; assistant treasurer and secretary, Arthur F. Gray, Boston. Louis B. Magid will be general manager. His office is now 509 Exchange Building, Boston. The Ballou Mill, which has a water privilege of 300 H. P., in addition to a steam equipment, will be somewhat remodeled and new machinery put in for spinning silk yarn and knitting silk hosiery and underwear. It is hoped to have the plant started early in the summer. Patent machinery will be used, which the company claims will enable them to produce goods 25 per cent. cheaper than the present methods.

Enlargements and Improvements.

—*Connecticut, New London. The Brainard & Armstrong Co. have now made arrangements to lease the Union St. school house, and will shortly remodel the same and equip with machinery.

—*Pennsylvania, Danville. F. O. Hartman is having an addition built to his silk mill 20x53, 3 stories. This will provide room for 2000 more spindles, employing 40 more hands.

Mills Starting Up.

—Connecticut, Shelton. A. & S. Blumenthal expects to have their new mill ready to occupy about the 15th of May and will then remove their machinery from the Franklin Brass & Bronze Co. building in Derby, where they have been temporarily located.

Miscellaneous.

New Mills.

—*New Jersey, Mt. Holly. The Davis & Hancock Mfg. Co., which is to move its plant from 4933 Richmond St., Bridesburg, Pa., to Mt. Holly, has incorporated under New Jersey laws. The firm will manufacture tapestries, lace curtains, etc.

—New York, N. Y. Einstein, Wolff & Co., embroidery manufacturers, 443 Broadway, will erect a five story factory building, on West 37th St., from the plans of architect George P. Chappell, 24 State St., New York.

Enlargements and Improvements.

—New Jersey, Carlton Hill. The Standard Bleachery Co., at this place, are adding a one story addition to give them increased facilities in their singeing department.

—Wisconsin, Baraboo. George McArthur & Son, Proprs., Baraboo Linen Mill, inform us that their addition will provide for 20 looms for making turkish towels, cotton crash, wash cloths, etc. They are in the market for a water wheel, water wheel governor, shafting and hangers, looms, sewing machines and electric lighting apparatus.

Mills Shutting Down.

—Rhode Island, Allenton. The Rodman Manufacturing Co. has shut down its woolen mill called the Silver Spring Mill and its cotton mill known as the Shady Lea Mill, and it is probable that the plants will be closed until June 13.

Failures and Suspensions.

—New York, Dryden. Hugo Dolge, proprietor, Dryden Woolen Mills, has been forced to make a general assignment for the benefit of creditors. He was carrying a large amount of the Alfred Dolge Co. paper, upon which he could not realize.

Fires.

—California, Petaluma. The California Woolen Mills, a 4 set plant, was destroyed by fire April 20th. Total loss, $35,000. Insurance, $15,000. Origin incendiary.

—Maine, Gardiner. The Gardiner Shoddy Mills were damaged by fire April 22nd. This plant is owned by the Dingley estate and is said to have no insurance. Loss about $8,000.

—Massachusetts, Haverhill. The woolen mill of the Roberts Woolen Mfg. Co., located about two miles from the city proper, was destroyed by fire early in the morning of April 5th. Fire started in the engine room and soon spread into the main building, which was completely wrecked. The loss is estimated at $15,000, including building and machinery. Building was owned by the Rosemont Factory Association.

—New York, Lockport. The cotton batting factory of E. W. Rogers Sons on Market St., was damaged by fire April 1th. Loss will be about $2200.

PERSONAL RECORD.

Cotton.

—Alan Anderson has accepted the position of overseer of carding at the Uncasville Mfg. Co., Uncasville, Conn., having succeeded Peter Muisnier, who resigned after serving 23 years.

—Charles May is now overseer of carding of mills 1 and 2, Dwight Mfg. Co., Chicopee, Mass. Hew as previously at the Atlantic Mills, Lawrence, Mass.

—Archibald Ennis has accepted the position of overseer of carding at the Millfort Mill, Fort Mill, S. C.

—A. J. Harris has resigned from the Lancaster Mills, Clinton, Mass.

—J. F. McKinnis, of Mt. Holly, N. C., has been appointed night spinning overseer at the Newton Cotton Mills, at Newton, N. C.

—Hector McConnell is to take charge of a mill at Versailles, Conn., having resigned hisp osition at the Uncasville Mfg. Co. Upon taking leave, Mr. McConnell was presented with a handsome upholstered chair and mirror by the employes.

—A. A. Orford, formerly finisher for the Norwich Bleachery, Norwich, Conn., has charge of the cloth room at the mills of the Uncasville Mfg. Co., Uncasville, Conn.

J. D. Lokey has secured position as superintendent of the Mountain Island cotton mills, N. C. He was formerly night superintendent at the Atherton Mills, Charlotte, N. C.

—John E. Fahey, boss spinner, has accepted a position with the mill now operated by Estate of James J. Regan, Rockville, Conn.

—Charles S. Smith will remove to Providence, R. I., at an early date. He has given up his position as designer at the C. A. Edgerton Mfg. Co., Shirley, Mass.

—Daniel Connery, for the past 49 years at the Lancaster Mills, Clinton, has resigned. For some time he was secondhand of the dyehouse.

—Capt. Charles H. Smith, of Suncook, N. H., has accepted a position as overseer in the cotton mills at Whitinsville, Mass.

—George Collins, formerly secondhand of the spooling and warping rooms of the Dartmouth Mill, New Bedford, Mass., has been promoted to the position of overseer.

—John Riley has left the employ of the Dartmouth Mill, where he was overseer of spooling, warping, and ring spinning, to take a similar position at the Howland Mill, New Bedford, Mass.

—John Shaver, of Greenville, S. C., is now employed at the Maginnis Mills, New Orleans, La., as secondhand in No. 3 weave room.

—Charles M. Harper has resigned his position at the Millfort Mfg. Co., Fort Mill, S. C., and secured a situation as

loom fixer at the Highland Park Mill, Charlotte, N. C.

—Fred E. Warren has accepted a position in a commission house in New York City, having given up his position as overseer of weaving at the Social Mill, Woonsocket, R. I.

—John R. Rostrom, formerly of the Atlantic Mills, Lawrence, Mass., has accepted a position as superintendent in an Alabama mill.

—Chas. L. Strolls is putting up the machinery for the Elmwood Mfg. Co., Columbia, S. C. Mr. Strolls was formerly at Lockhart Cotton Mills, S. C.

—William J. Cameron, Fireman of the Slater Cotton Company, of Pawtucket, R. I. Monday afternoon met with a very serious accident, while working on a pump. His sleeve got tangled in the gear, drawing in his right arm. It was severely crushed, and had to be amputated.

—Samuel Potter has severed his connection with the China Mill, Suncook, N. H., after serving many years as overseer in one of the rooms. Fred Millard will temporarily take his place, who has charge of similar work at the Webster and Pembroke mills.

—F. D. Ballou, formerly overseer of carding for the Paul Whitin Manufacturing Co., of Northbridge, Mass., has now taken a position as assistant superintendent at the Utica Steam Cotton Mills, Utica, N. Y.

Woolen.

—George Westbrook has been succeeded by Mr. Bullard, of Watervliet, N. Y., as boss dyer at the Harrisville Woolen Mills, R. I.

—Thomas F. Hall has resigned as overseer of weaving at the Broad Brook Woolen Co., Broadbrook, Conn., to go to Andover, Mass.

—Michael Riley has concluded his services as overseer of spinning in Legg's mill, Elmville, Killingly, Conn., to go to Plainville.

—Miss Augusta H. Briard has concluded her services at the Pacific Mills, Lawrence, Mass., and will reside with her brother-in-law in Salem. She served the above mills faithfully for 45 years, being 30 years in the ctrd room under Overseer Albert W. Brainard.

—Frank Cogswell has resigned as boss finisher at the Warren Woolen Co., Stafford Springs, Conn., having been with the above firm for a number of years. J. A. Cowen has succeeded Mr. Cogswell.

—B. K. Quinlan has resigned as superintendent of the finishing department of Holden, Leonard & Co., Bennington, Vt., and intends engaging in some other business.

—Nicholas Mahr has accepted a position in the finishing department of the Hockanum Mill, Rockville, Conn.

—Fred N. Sawyer is now assistant designer and superintendent of the Windsor Falls Mfg. Co., Adams, Mass. He was formerly with William Inman, Harrisville, R. I., also at Chepachet, R. I.

—George W. Vickery, Jr. has resigned as superintedent of the Windsor Falls Mfg. Co., Adams, Mass.

—D. Pelkey is engaged as loom fixer at Metcalf's mill, Mohegan, R. I., having resigned from the Mapleville Mills.

—Hayward Ramsden, finisher at the woolen mill at Moosup, Conn., on his 44th birthday was presented with $25 and a smoker's set; and Mrs. Ramsden was presented with a gold pen and holder.

—A. H. McSorley is now employed as overseer of carding at the Brown Mfg. Co. He was formerly with the Newport Woolen Mills, Newport, Me.

—James Carnaghan, of Westerly, has secured work in the shearing department of the Manville mill, Manville, R. I.

—Thomas Tomlinson, formerly of the Manville Mill, Manville, R. I., has accepted a position at Centreville.

—George P. Newell has accepted a position as designer with the French River Textile Company, Mechanicsville, Conn., having resigned his position with W. E. Tillotson, Pittsfield, Mass.

—Dennis P. Nelligan, of Monson, has secured a position with the Riverside Woolen Co., Stafford, Conn., as loom fixer.

—Edward Saunders has resigned as boss weaver at the Hillsboro Woolen Mill, Hillsboro Bridge, N. H.

—J. W. Bullard, boss dyer, Broad Brook, Conn., has removed to Harrisville, R. I.

—R. W. Barber has resigned as superintendent of the Brown Mfg. Co., Dover, Me.

—Job Hainsworth, formerly at North Vassalboro Woolen Mills, North Vassalboro, Me., has the position of overseer of weaving at the Merchants Woolen Mills, East Dedham, Mass.

—R. F. McGregor has become boss weaver at the Crown Mills, Marcellus, N. Y.

—George O. Benton, of Glenville, Conn., has been employed as loom fixer at the woolen mill at Glendale, R. I., taking William Foster's place.

—George L. Dickey has accepted the position of overseer of carding at the Hudson Woolen Mills, Hudson, Mass.

—Charles F. Peasley, formerly with Rawitzer Bros., Northbridge, Mass., has been engaged as dyer overseer of the Collins Mills, Collinsville, Mass. He has been dyer overseer at Madison, Me., and Monson, Mass.

—William C. Haberer, a wellknown superintendent of the Seneca Woolen Company, Seneca Falls, N. Y., has accepted the position of superintendent at Bedford City, Va., having been offered liberal inducements.

—C. H. Drabble has succeeded W. J. Collins as boss spinner of the Dayville Woolen Co., Dayville, Conn. Mr. Collins resigned on account of ill health.

—F. C. Werner, formerly with Phillips & Kunhardt, Lawrence, Mass., has secured the position as superintendent of the Seneca Woolen Co., Seneca Falls, N. Y.

—Arthur William Etchells, formerly designer with Taylor Bros., Huddersfield, England, has accepted the position as manager and designer with the firm of Shaw, Esrey & Co., Ltd., Chester, Pa.

—Dennis Dunn has secured a position as superintendent of the Dingley Mfg. Co., Philadelphia. He was formerly superintendent of the Pennsylvania Woolen Co., Philadelphia, Pa.

—Atack Musgrave, a well known boss dyer, has accepted position with the Dundee Woolen Co., of Passaic, N. J.

—James Roberts, of Middleboro, Mass. is now with the Conshohocken Woolen Co., West Conshohocken, Pa., as boss finisher.

—Thomas Robertshaw has resigned his position at Collinsville, Mass., and has been employed as fuller at the Washington Mills.

—John B. Hutchison has secured the position of second hand carder at the M. Collins Woolen Manufacturing Co.'s mill, Collinsville, Mass., having concluded his services at the Vassalboro Woolen Mills, North Vassalboro, Maine.

—Patrick Cuff has resigned at the Dayville Woolen Co., Dayville, Conn., and intends going to Ashland, N. H.

—B. J. Cullman, formerly assistant superintendent of the M. Collins Manufacturing Company, Collonsville, Mass., has succeeded the former superintendent, having resigned his position at the Highland Mills, Huntington, Mass.

—Henry Riegelhaupt, having concluded his services with the Hawthorne Woolen Mills, Glenville, Conn., has accepted a position as fuller with the Merrimack Woolen Mills, Dracut, Mass.

—John S. Robinson, formerly of Ayrshire Mills, Skaneateles Falls, N. Y., has accepted a position as carder with the Knox Hill Co., Warsaw, Ill.

—Simon Taylor, formerly superintendent of the Berkeley Mills, has concluded his services with Beebe & Webber, of Holyoke, Mass., to go back to Staffordville, Conn.

—F. B. Cogswell has taken a position as overseer of finishing at the Mayo Woolen Mill, Millbury, Mass.

—Emmet Ainley has recently been engaged in a woolen mill in Philadelphia, Pa. Mr. Ainley was formerly assistant designer at the Rock Mill, Rockville, Conn.

—Frank L. Sarr has recently succeeded A. H. McSorley as boss carded at Newport, Me.

—Paul Gauthier has concluded his services with the Summit Woolen Co., Staffordville, Conn., as boss weaver.

—Fred W. Sawyer, boss weaver, has resigned his position in Clarence Maguire's Mill, Chepachet, R. I.

Knit.

—George J. Manderfield has accepted the position as boss knitter with Brinton & Co., Philadelphia, manufacturers of knitting machinery.

—Frank Purdy has accepted a position in charge of the press and finishing rooms at the Capron Knitting Mill, Capron, N. Y.

—J. L. Chase, formerly superintendent of Mill No. 2, Globe Knitting Mills, Cohoes, N. Y., intends starting a mill about May 1st in Amsterdam, N. Y.

—William Scott, of Amsterdam, N. Y., has been employed as foreman of the carding department of L. E. Harrower's Anchor Mill, Hagaman, N. Y.

Deaths.

—William Liley, of 105 Pensdale St., Philadelphia, Pa., a wool sorter in Schofield's mill, was found dead April 10th in the Manayunk Canal. He was 58 years old. His death is a mystery, which the police are trying to clear up.

—Louis Sharrow, who has been employed as secondhand in the dyehouse of the Windsor Print Works, North Adams, Mass., while at the top of a ladder working on a belt, was suddenly caught between the pulley and shafting, and killed before machinery could be stopped. He was 28 years old and had been married two years.

—Joseph H. Libby, carding overseer at the York Mills, Saco, Me., died March 28th of pneumonia, leaving a widow, daughter and son.

—Daniel N. Davis, of Berwick, Me., was buried Tuesday afternoon, April 5th, aged 80 years. His death was due to apoplexy. For a number of years he was engaged at the Great Falls Manufacturing Co., Great Falls, N. H., and was also for some years superintendent of a mill in Lowell, Mass. His latter years were spent on his farm in Berwick, where he was born.

—Henry F. Scatchard, of Norristown, Pa., a manufacturer of cotton and woolen goods, died at the age of 57 years, March 19th. He was much esteemed among the trade.

—Horatio Hathaway of New Bedford, age 67 years, died recently. He was president and a director of the Acushnet mills and Hathaway Manufacturing Corporation, a director of the Mechanics National Bank, the Potomska Mills and the Wamsutta Mills. Among his large real estate interests in Boston was the Hathaway Building corner of Atlantic Avenue and Summer St.

—The Hon. John L. Houston died at his home in Hartford, Conn. on Friday, April 15th, 64 years of age. Mr. Houston started in work in the dye house of the Hartford Carpet Co., in 1854 being promoted to the position of assistant superintendent of the company, in which capacity he worked conscientiously for twenty-four years, and in 1878 he was elected president, which office he gave up about a year ago on account of his health.

—Sumner A. Homes, died recently at his home in Turner, Me., aged 56. He was for many years an employe of the Turner Woolen Mill, and during the funeral the mill was closed.

—Harry Lund, a worsted yarn broker of Philadelphia, died March 23, at the age of 38, of apoplexy. He was connected with the Landenberg Worsted Mills, where his father had charge. He leaves a widow and one child.

—Thomas Bennett, Jr. died Sunday, April 17th. He was for 27 years superintendent and agent of the Wamsutta Mills, New Bedford, which mills were organized largely through his efforts. He resigned in April, 1874, and was not engaged in active business since that time.

BUYERS' INDEX

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

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Architects and Mill Engineers.
Berlin Iron Bridge Co, The, East Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Automatic Boiler Feeds.
D'Este & Seeley Co, 29 Haverhill St, Boston,

Automatic Feeds for Cotton and Wool.
Harwood, Geo. S, & Son, 53 State St, Boston.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Balling Machine.
Torrance Mfg. Co, 18 Davis St, E. Newark, N. J.

Bandings.
See under Yarns.

Belting.
Alexander Bros., 410 No. 3d St., Phila., Pa.
Billington, J. H. & Co., 113 Chestnut St., Philadelphia.
Boston Belting Co., 256 Devonshire St., Boston, Mass.
Fell, Geo. & Son, Bolton, England.
Link Belt Machinery Co., Chicago, Ill.
Ulmer Leather Co, Norwich, Conn.
See also Mill Supplies.

Belt Dressing.
Alexander Bros, 410 No. 3d St, Phila, Pa.

Bindings.
See Tapes and Braids.

Bleaching Materials.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Boiler Compounds.
Carr Manufacturing Co., 69 Beverly St, Boston.
Imperial Chemical Co, 324 St. John St, Phila. Pa.

Boxes, Cloth Boards, Etc.
Pearson, J. T, Kensington, Pa.

Braids.
See Tapes, Braids and Edgings.

Burr Pickers.
Curtis & Marble Machine Co., Worcester, Mass.
Sargent's, C. G., Sons, Graniteville, Mass.

Card Clothing.
Ashworth, Elijah, Fall Biver, Mass.
Leigh, Evan A, 35 Mason Building, Boston.

Calico Printers' Machinery and Supplies.
Butterworth, H. W., Sons & Co., Philadelphia.
New Bedford Copper Co, New Bedford, Mass.
Phillips Co, The Thomas, Providence, R. I.
See also Dyeing, Bleaching Machinery, etc.

Carders' Tools.
Brown, W. H, Mechanic St, Worcester, Mass.

Carpet Machinery.
Altemus, W. W, & Son, 2816 N. 4th St, Phila, Pa.
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester, Ms.
Furbush, M. A, & Son, Machine Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Chemicals and Apparatus.
Bullock & Crenshaw, 528 Arch St, Phila, Pa.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Chemist.
Adriance, John S., 105 East 39th St., New York.

Cloth Boards.
Flanders, E. A., North Dexter, Me.

Cloth Testing Machine.
McKnight, S, 771 Broadway, New York.

Combs (Wool and Cotton).
Crabb, William, & Co, Newark, N. J.
Townsend, Thomas, 157 Orange St., Providence, R. I.

Comber Needles.
Townsend, Thos., Providence, R. I.

Commission Merchants.
Hayes, O. H, & Co, New York.

Copper Print Rollers.
New Bedford Copper Co, New Bedford, Mass.
Phillips Co, The Thomas, Providence, R. I.
Revere Copper Co, 174 Oliver St, Boston.

Copper Work for Dyers.
Phillips Co, The Thomas, Providence, R. I.

Cotton (Egyptian).
Stoddard, Haserick, Richards & Co., Boston.

Cotton Machinery.
Altemus, W. W, & Son, 2816 N. 4th St, Phila. Pa.
Ashworth, Elijah, Fall River, Mass.
Cobb, Thad. S., Machinery Co., Lowell, Mass. Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Co, 22d and Wood Sts, Philadelphia.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kilburn, Lincoln & Co, Fall River, Mass.
Leigh, Evan A, 35 Mason Building, Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Payne, Geo. W, & Co, Pawtucket, R. I.
Phillips Co, The Thomas, Providence, R. I.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Townsend, Thomas, 157 Orange St., Providence, R. I.
Whitin Machine Wks, Whitinsville, Mass.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Cotton Openers and Lappers.
Howard & Bullough American Machine Co, Pawtucket, R. I.

Cutters for Knit Fabrics.
Kennedy, Thos. (Cutters, etc.,) Cohoes, N. Y.

Damper Regulators.
D'Este & Seeley Co. (Curtis), 29 Haverhil St, Boston, Mass.

Designers.
Fresnel, Gustave, 125 W. 56th St, N. Y.

Dryers.
Philadelphia Textile Machinery Co, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Dusters.
See Wool and Waste Dusters.

Dyeing, Bleaching and Finishing.
Greenwood, R. & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket and Valley Falls, R. I.

Kensington Dye Works, Kensington, Pa.
Littlewood, G. J., & Sons, Manayunk, Pa.
Warren, W, Thread Works, Westfield, Mass.
Webster Dye Works, Webster, Mass.

Dyeing, Drying, Bleaching and Finishing Machinery.

Butterworth, H. W, & Sons Co, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Co, 22 and Wood Sts, Philadelphia.
Granger Foundry & Machine Co, Providence, R. I.
Hopkins, A, & Co, Bridgeton, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Lincoln & Co, 54 Arch St, Hartford, Ct.
Phenix Iron Foundry, Providence, R. I.
Phillips, The Thomas Co, 91-95 South Main St, Providence, R. I.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass. (Drying.)
Woonsocket Machine & Press Co, Woonsocket, R. I.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Dye Sticks.

Haedrich, E. M, 311 1-2 Walnut St, Phila, Pa.

Dyestuffs and Chemicals.

Amend Process Co., 205-211 Third Ave., New York.
Anchor Color Mfg. Co, 464 Cherry St, New York.
Bischoff, & Co, 87 Park Place, N. Y.
Bosson & Lane, 36 Central Wharf, Boston.
Cochrane Chemical Co., 50 Kilby St., Boston.
Corey, S. J, 273 Congress St, Boston.
Dillon & Co, 20 Cedar St., New York.
Farbenfabriken of Elberfeld Co, 77 William St, N. Y.
Geisenheimer & Co, 189 Front St, New York.
Hanna-Schoellkopf Co, Philadelphia, Pa.
Holliday, Read, & Sons, 100 William St., New York.
Innis & Co, 3 Cedar St, New York.
Jaeck Bros., The, Co., 62-66 No. 11th St, Brooklyn, N. Y.
Janney, O. S, & Co, Phila. and Boston.
Johnson, Chas. A, & Co, 22 Dey St, N. Y.
Johnson, Wm. G, & Co, Uncasville, Conn.
Keller, John J, & Co, 104-106 Murray St, N. Y.
Klipstein, A, & Co, 122 Pearl St, N. Y.
Koechl, Victor, & Co, 79 Murray St., N. Y.
Matheson, W. J, & Co, 182-184 Front St, N. Y.
Merrimac Chemical Co, Boston, Mass.
N. Y. & Boston Dyewood Co, 55 Beekman St, New York.
Oakes Mfg. Co, 93 Pearl St, N. Y.
Phillips (Moro) Chemical Co, 131 S. 3d St, Phila., Pa.
Pickhardt & Kuttroff, New York.
Roessler & Hasslacher Chemical Co, 100 William St, New York.
Sharpless Dye Wood Ext. Co., 22 N. Front St, Phila, Pa.
Stamford Mfg. Co, 133-137 Front St., N. Y.
Stone & Ware Co, The, 157 Maiden Lane, N. Y.
Sykes & Street, 85 Water St, N. Y.
Thomas, N. Spencer, Elmira, New York.
Webster Dye Works, Webster, Mass.

Dyers and Finishers.

Boston Finishing Works, Williamstown Mass.
Cranston Worsted Mills (yarns), Bristol R. I.
Firth & Foster Co, Kensington, Pa.
Greenwood, R. & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket, R. I.
Oakdale Dye Works, 913 W. York St, Phila, Pa.
Pawtucket Dyeing & Bleaching Co, Pawtucket, R. I.
Warren, W. Thread Works, Westfield, Mass.
Webster Dye Works, Webster, Mass.

Dyers' Clogs.

Wildman, Jos, & Co, 1908 N. Front St, Phila.

Edgings.

See Tapes, Braids and Edgings.

Electrotyping and Printing.

Whitcomb, H. C, & Co, Boston.

Elevators.

Cohoes Foundry & Machine Co, Cohoes, N.Y.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Salem Foundry & Machine Shop, Salem, Mass.
St., New York.

Engineers, Mechanical.

Berlin Iron Bridge Co, E. Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Express Money Orders and Travelers' Cheques.

American Express Co, offices in every city

Fans—Exhaust and Ventilating.

See Ventilating Apparatus.

Feeders

See Card Feeds.

Feed Water Pumps.

Goulds Mfg. Co, Seneca Falls, N. Y.
Phœnix Iron Foundry, Providence, R. I.

Finishing Machinery.

See Dyeing, Drying, Bleaching and Finishing.

Fluted Rolls.

Cohoes Foundry & Machine Co, Cohoes, N.Y
Thurston, A. G, & Son, Box 528, Fall River. Mass.

Fulling Mills for Woolen Goods.

Hopkins, A, & Co. Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter Jas, Machine Co, No. Adams, Mass.

Gas Engines.

Jones, Lewis, 60½ and Media Sts, Phila, Pa.

Gas Singeing Machines.

Butterworth, H. W. Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Ms.

Gear Cutting Machine.

Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E, Co, New London, Conn.

Harness Varnish.

D. L. Witmer & Bro, 5th St. and Germantown Ave, Philadelphia.

Heating.

See Ventilating.

Heddles.

Watson, L. S, Mfg. Co, Leicester, Mass.

Hosiery Boards.

Pearson, J. T, Kensington, Pa.

Hose and Rubber Goods.

Boston Belting Co., 256 Devonshire St., Boston.

Index.

Burr Index Co, 236 Asylum St, Hartford, Conn.

Ink, Stamping.

Witmer, D. L, & Bro, 5th St. and Germantown Ave, Philadelphia.

Insurance (Employers' Liability).

Employers' Liability Assurance Co, 28 Central St, Boston, Mass.

Knit Goods Edgings, Trimmings, etc.

Byram, F. A, Germantown, Pa.
Cheney Bros, Silk Goods, 479 Broome St, N. Y.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Friedberger & Co, Edgings, Germantown Phila, Pa.
Hepner & Horwitz, Lacings, 30 Howard St, N. Y.
Krout & Fite Mfg. Co, 2632 Mascher St, Phila.
Weimar Bros, 1817 East York St, Phila. Pa.

Knit Goods Finishing Machines, Crochet, Etc.

Excelsior Sewing Machine Co, 120 N. 7th St, Phila, Pa.
Merrow Machine Co, The, Hartford, Conn.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 2097 E. Cumberland St, Phila, Pa.

Knit Goods Brushers.
Ardrey, S. B, & Sons, Bristol, Pa
Jones, Lewis, Philadelphia, Pa.
Musgrove, C. M., Plainville, Conn.

Knitting Machine Cylinders.
Paxton & O'Neill, 129 Bread St, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.

Knitting Machinery.
Boss Knitting Machine Works, 7th and Walnut Sts., Reading, Pa.
Branson Machine Co., 506 John St., Philadelphia.
Brinton, H, & Co, 213 Race St, Phila, Pa.
Campbell & Clute, Cohoes, N. Y.
Cooper, Chas, Bennington, Vt.
Crane Mfg. Co, Lakeport, N. H.
Eckersley, Richard, N. E. cor. American and York Sts, Philadelphia, Pa.
Excelsior Knitting Machine Manufacturing Co., Allentown, Pa.
Hepworth & Co, Lehigh Ave. and Mascher St, Phila, Pa.
Jenckes, E. Mfg. Co, Pawtucket, R. I.
Jones, Lewis, 60 1-2 and Media Sts, Philadelphia, Pa.
Kennedy, Thos. (Cutters, etc.), Cohoes, N. Y.
Keystone Knitting Machine Mfg. Co, 40 No. 7th St, Philadelphia, Pa.
Lamb Mfg. Co., Chicopee Falls, Mass.
Leighton Machine Co, Manchester, N. H.
Little Hustler Napper Co., Hudson, N. Y.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
McMichael & Wildman Mfg. Co, Norristown, Pa.
Mueller, A, 760 Lexington Ave, Brooklyn, N. Y.
Nye & Tredick, 606 Arch St, Phila, Pa.
Paxton & O'Neill. 127 Bread St, Phila, Pa.
Payne, G. W. & Co, Pawtucket, R. I. (Winders.)
Pepper Mfg. Co, Lakeport, N. H.
Scott & Williams, 2097 E. Cumberland St., Phila., Pa.
Stafford & Holt, Little Falls, N. Y.
Standard Machine Co., 508 Minor St., Philadelphia, Pa.
Taylor, James, 835 Arch St, Phila, Pa.

Knitting Needles and Supplies.
Breedon, Wm, & Son, Amsterdam, N. Y.
Cooper, Chas, Bennington, Vt.
Corey, Wm, Co, Manchester, N. H.
Crane Mfg. Co., Lakeport, N. H.
Dodge Needle Co., Manchester, N. H.
Goldstein, J. 416 Arch St., Philadelphia.
Ives, Loyal T, New Brunswick, N. J.
Keystone Knitting Machine Mfg. Co, 40 No. 7th St, Philadelphia, Pa.
Lydall, H, & Foulds, Manchester, Conn.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Musgrove, C. M., Plainville, Conn.
Page Needle Co, Chicopee Falls, Mass.
Treat, Orion, Manchester Green, Conn.
Wardwell Needle Co, Lakeport, N. H.

Laboratory Outfits.
Bullock & Crenshaw, 528 Arch St Phila, Pa.

Lamps, Electric.
Beacon Lamp Co, New Brunswick, N. J.
Lynn Incandescent Lamp Co., Lynn, Mass.

Looms.
Crompton & Knowles Loom Works, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Works, 22d and Wood Sts. Philadelphia.
Furbush, M. A, & Son Co, Phila, Pa.
Howard, Geo. C., 1733 Barker St, Phila Pa. (For wire.)
Kilburn, Lincoln & Co, Fall River, Mass.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Whitin Machine Works, Whitinsville, Ms,
Woonsocket Machine & Press Co, Woonsocket, R. I.

Loom Picker Manufacturers.
Crompton & Knowles Loom Works, Worcester, Mass.
Loom Picker Co, Biddeford, Me.

Lubricators.
Dixon, Jos, Crucible Co, Jersey City, N. J.

Lumber.
Stearns, A. T, Lumber Co, Neponset, Mass.

Lumpers.
Gerry, George, & Son, Athol, Mass.

Machinery Dealers.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Schofield, Geo. L, 123 N. Front St, Phila,
Scott, James, 242 Chestnut St, Phila, Pa.

Machinery Wipers.
American Silk Mfg. Co, 311 Walnut St Philadelphia, Pa.
Wilkinson, Seth, Pawtucket, R. I.

Machinists' Tools.
Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E. Co, New London, Conn.

Mails.
Walder, J, Paterson, N. J.

Measuring and Folding Machines.
Curtis & Marble Machine Co, Worcester, Ms.
Elliott & Hall, 544 Hermon St, Worcester, Mass.

Mills For Sale.
Denny, R. B., 143 Federal St., Boston.

Mill Builders and Engineers.
Berlin Iron Bridge Co, The, East Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Mill Supplies.
American Supply Co, Providence, R. I.
Bamford & Smith, Pascoag, R. I.
Bristol, The, Co., Waterbury, Conn
Buckley's, Benj. Son, Gun Mill, Paterson, N. J.
Douglas Manufacturing Co., Fall River, Mass.
Harwood, Geo. S, & Son, 53 State St, Boston.
Hill, Jas, Mfg. Co. Providence, R. I.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Spofford, Wm. S, & Son, 5-11 Culver St, Providence, R. I.
Stevenson Bros. & Co, 132 So. 2d St, Philadelphia, Pa.
Thurston, A. G, & Son, Fall River, Mass.
Watson, L. S, Mfg. Co, Leicester, Mass.

Napping Machines.
American Napping Machine Co, Williamstown, Mass
Ardrey, S. B, & Sons, Bristol, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Jones, Lewis, 60 1-2 and Media Sts., Philadelphia, Pa.
Little Hustler Napping Co, Hudson, N. Y.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Oilless Bearings.
N. American Metalline Co, 62 W. Ave. and 3rd St, Long Island City, N. Y.

Oil Filters.
Burt Mfg. Co, Akron, Ohio.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Pantagraphs for Mill Engraving.
Johnson, C. A, & Co, 22 Dey St, New York.

Patent Solicitors.
Crosby & Gregory, 24 School St, Boston, Mass.
Massink, H., Amsterdam, Holland.
Wright, Brown & Quinby, 53 State St, Boston, Mass.

Penstocks.
Dalrymple, George, Fair Haven, Vt.

Perforated Copper
Beckley, A. J. & Co., Garwood, N. J.

Peroxide of Sodium.

Roessler & Hasslacher Chemical Co., 100 William St, New York.

Picker Sticks.

Loom Picker Co., Biddeford, Me.
Smith, Lee, & Co., Knoxville, Tenn.

Picking, Carbonizing and Garnetting.

Garfield Woolen Co, Garfield, N. J.
Kennebec Woolen Mills 2025 Naudain St., Philadelphia.

Pipe Covering (Magnesia).

Keasby, R. A, 54 Warren St, New York.
Keasby & Mattison Co. Ambler, Pa.
Nightingale, S. C, & Childs, Atlantic Ave, Boston, Mass.

Pneumatic Conveying.

See Ventilating.

Power Transmitting Machinery.

Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunter, Jas, Machine Co, No. Adams, Mass.
Kilburn, Lincoln & Co, Fall River, Mass.
Link Belt Machinery Co, Chicago, Ill.

Presses.

Crawford, J. J, & Son, Nashua, N. H. (Power Screw, Hydraulic, Hollow Steam Plate.)
Curtis & Marble Machine Co, Worcester, Ms.
Hart, Charles, Frankford, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Phillips Co, The Thomas, Providence, R. I
Pownall, F. H, Iron Works, Jamesburg, N. J.
Sullivan Machinery Co., Claremont, N. H.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Pressure Regulators for Steam and Water.

D'Este & Seeley Co. (Curtis) 29 Haverhill St, Boston, Mass.

Printers and Embossers.

Novelty Textile Printing Co, 447-449 W. 14th St, New York.

Pumps.

Goulds Mfg. Co, Seneca Falls, N. Y.

Reed and Harness Manufacturers.

American Supply Co, Providence, R. I.
Loom Picker Co, Biddeford, Me.
Walder, J, Paterson, N. J.

Ribbons.

Cheney Bros, S. Manchester, Ct.

Roller Skins.

Fell, Geo, & Son, Bolton, England.

Roofing, Gravel, Slag and Composition.

Armitage Mfg. Co, Richmond, Va.
Johns, H. W., Mfg. Co., 100 William St. New York.
Warren Chemical & Mfg. Co, 45 Fulton St, New York.

Roofing, Paint and Paper.

Armitage Mfg. Co, Richmond, Va.

Roving Cans and Sheet Metal Work for Mills

Hill, Jas, Mfg. Co, Providence, R. I.
Laminar Fibre Co., No. Cambridge, Mass.
N. E. Ventilating & Heating Co, 930 Manton Ave. Providence, R. I.
Sullivan Machinery Co, Claremont, N. H.

Saddles, Stirrups and Levers.

Dixon Lubricating Saddle Co, Bristol, R. I.

Sample Cutters.

Gleason, A. H, Rockbottom, Mass.

Schools.

Gavey Correspondence School of Textile Design. P. O. Box 222, Brooklyn, N. Y.
Lowell Textile School, Lowell, Mass.
Philadelphia Textile School, Phila, Pa.

Sewing Machines and Supplies.

Curtis & Marble Machine Co, Worcester, Mass.
Frame, Gibbons, 2nd and Diamond Sts, Phila, Pa.
Manufacturers' Supplies Co, 66 No. 4th St., Philadelphia.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 6th and Arch Sts, Phila, Pa.

Shearing Machinery.

See Dyeing, Drying, Bleaching and Finishing.

Shell Rolls.

Cohoes Foundry & Mach. Co, Cohoes, N. Y.
Thurston, A. G, & Son, Box 528, Fall River, Mass.

Shoddies.

See Wool Shoddies.

Shuttles.

See Bobbins, Spools, Shuttles, Etc.

Silk Machinery.

Butterworth, H. W. Sons Co, Philadelphia.
Crompton & Knowles Loom Works, Worcester, Mass.

Singe Plates.

Butterworth, H. W. Sons Co., Philadelphia.
New Bedford Copper Co. New Bedford, Ma.

Sizing, Starch and Gums.

American Glutrose Works, Penn Mutual Bldg. Phila, Pa.
Stein, Hirsch & Co, 165 Duane St, New York.

Slashers.

Cohoes Foundry & Machine Co, Cohoes, N. Y.
Lowell Machine Shop, Lowell, Mass.
Phillips Co, The Thomas, Providence, R. I.

Soaps.

American Soap & Washolene Co, Cohoes, N. Y.
Holbrook Mfg. Co., 466 Washington St., N. Y.
India Alkali Works, Boston.

Spindles.

Buckley, Benj's, Sons, Gun Mill, Paterson, N. J.
Draper Company, Hopedale, Mass.
Ward & Vandegrift, Elmer, N. J.
Whitin Machine Wks, Whitinsville, Mass.

Spindle Tubes.

Bamford & Smith, Pascoag, R. I.

Spinning Cylinders.

Hill, Jas, Mfg. Co, Providence, R. I.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Spinning Frames.

See Cotton Machinery.

Spinning Frames for Wool

Woonsocket Machine and Press Co., Woonsocket, R. I.

Spinning Rings.

Draper Company, Hopedale, Mass.
Whitinsville Spinning Ring Co, Whitinsville, Mass.

Spinners' Supplies.

Dixon Lubricating Saddle Co, Bristol, R. I.

Spinning Tubes.

Buckley, Benj's. Son, Gun Mill, Paterson, N. J.

Steam Boilers.

Brown, C. H, & Co, Fitchburg, Mass.

Steam Boiler Insurance.

Hartford Steam Boiler Inspection & Insurance Co, Hartford, Conn.
Mutual Boiler Insurance Co, 31 Milk St, Boston.

Steam Damper Regulators.

D'Este & Seeley Co, 29 Haverill St, Boston Mass.

Steam Engines.

Brown, C. H, & Co, Fitchburg, Mass.
Hooven (The), Owens & Rentschler Co, Hamilton, O.

Steam Separators.
D'Este & Seeley Co. (Curtis), 29 Haverill St., Boston.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Steam Specialties.
Butterworth, H. W. Sons Co., Philadelphia.
D'Este & Seeley Co, 29 Haverhill St, Boston
Haines, W. S. C 136 South 4th St, Phila, Pa.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Steam Traps.
D'Este & Seeley Co. (Curtis) 29 Haverhill St, Boston, Mass. (return float and expansion).
Haines, W. S. C 136 South 4th St, Phila, Pa.

Tanks, Tubs and Vats.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Challenge Wind Mill & Feed Mill Co. 195 High St, Boston, Mass.
Corcoran, A. J, 11 John St, New York.
Cypress Lumber Co, Apalachicola, Fla.
Stearns, A. T, Lumber Co, Neponset, Mass.
Woolford, George, 2340 No. 9th St, Phila. Pa

Tapes, Braids and Edgings.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Friedberger & Co, Germantown, Pa.
Goff, D. & Sons, Powtucket, R. I.
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Challenge Wind Mill & Feed Mill Co, Boston, Mass.

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Mr. Van Everen, of our office, was for a number of years an Examiner in the U. S. Patent Office, in the Division of Textiles.

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1268 **Woolen** superintendent or designer. First-class experience in England and America. A first-class man in every way; age 34; married. Fancy worsteds, cheviots, novelty goods, cassimeres, overcoatings, cloakings, dress goods, piece dyes, worsteds and cheviots.

1305 **Superintendent and Designer** with 20 years' experience in woolen mills, on cassimeres, cheviots, worsteds and cloakings. Is now out of employment. Wants position at once.

1255 **Felts.** The advertiser has a thorough, practical knowledge of all the details connected with the manufacture of paper makers' felts and jackets; especially adapted for fast running machines; good reason why he is now in the market; recommended by past employers.

1250 **Superintendent,** or would accept a position as designer in a good woolen mill. Understands fancy cassimeres, cloakings, dress goods, kerseys, unions and worsteds. Can produce the Jacquard effect on an ordinary cotton, Knowles loom. Refers to good mills.

1239 **A man who understands the** manufacturing of woolens in all the details, is open for an offer. Is an experienced manager, and is at present in charge of a mill that is being run at a profit.

COTTON SUPERINTENDENTS.

1337 **Assistant Superintendent.** Expert on book binder's cloth, window shades, fan cloths, friction callender machines. 20 years with Wilson & Bentleys, London, and about 2 years employed in this country. Age 45, married. American and English references.

1332 **Supt. with long experience** in both Northern and Southern mills. Has started 3 Southern mills, on print cloths, broad and narrow sheetings and fine shirtings. First class references from all past positions. Age 48. Might accept position as overseer of large weave room.

1265 **Superintendent** wants position as superintendent of cotton cloth mill. Has had charge of each department in the mill; aged 28 years; married.

1266 **Cotton** superintendent wants position. Out on account of mill shutting down. Understands fancy and plain cottons, white and colored. Has a first-class record.

1267 **Cotton** superintendent or carder. Prints, sheetings, ginghams, fine and coarse, white and colored. Nearly all kinds of machinery. References all right. Age 47; married.

1159 **Woolen Superintendent.** A first class man on carriage robes, furniture plush, bed and horse blankets. Has excellent references. Has held present position as superintendent for several years; good reasons for desiring a change. Age 39; married.

1227 **A Superintendent** with a thorough practical training in all the departments of a woolen mill making worsted cassimeres, dress goods, cloakings, overcoatings, robes, blankets, shawls, etc. Has a thorough knowledge of designing and has held position in first class mill, to which he can refer.

1306 Young American wants position as cotton superintendent. Experience mostly on cotton warps. Has been bookkeeper, overseer of carding and spinning; also superintendent in Massachusetts mills.

1114 **Superintendent and Overseer,** wants position on cotton goods, has had a first-class experience, and can furnish first-class references. Will go anywhere; age 39 and married; salary reasonable; is a first class man on seamless bags.

1108 **Cotton Superintendent** or would accept position as overseer of large mule spinning department. Has good references and a first-class record, and is a thorough mechanic; familiar with all kinds of yarns, especial hosiery and prints; age 40 and married.

WOOLEN CARDERS.

1241 **Woolen Carder.** Age 40; married. Overseer 14 years in one place. Long experience on all-wool, wool and cotton mixed, shoddy, etc. Temperate, and can furnish good references. Prefers Philadelphia.

1082 **Woolen carder experienced on** all classes of underwear. Has worked for eight years in one mill, 29 years of age and married. Good references.

1197 **Woolen Carder** wants position. Overseer over 16 years in some of the best woolen mills. Accustomed to all kinds of work. Age 50; married. Well recommended.

1190 **Woolen** Carder or Spinner. Age 47; married. One reeler and one piecer in family. Has been overseer and spinner for the last fifteen years for one firm, which is now out of business. Refers to past employers. Can take position at once. Familiar with wool shoddy and cotton; Furbush, Lee and other makes of machinery.

1180 Wants position as 2nd hand of carding in woolen or knit mill. Age 23; single. Has been successful in like position. Prefers position in Mass., R. I., Conn., N. H., Penn., N. Y. or N. J. References if required.

1286 First-class Carder, now employed, wishes a better position. Has the best of references from good mills. Excellent manager of help. Age 35; married. Experience on broadcloth, dress goods, covert cloth and meltons.

1270 **A 1 Carder,** wool or cotton, 11 years experience, first-class references, reliable, temperate and industrious, desires immediate position. Age 30. Will go any where.

1307 **Carder** with unusually fine record and very wide experience desires good position in New England, Central or Western States. First class references from past positions. Age 44. Experience on cassimeres, cheviots, dress goods, broad-cloth, repellants and blankets.

COTTON CARDERS.

1339 **Cotton Carder,** young man holding first-class position in New York State, would like position in Eastern or Middle States as assistant superintendent or boss carder paying $5.00 or more a day. Is worth that salary; experience and references of the best.

1366 **Second Hand Cotton Carding,** at present employed, but want to change for position paying $2.50. Experience from .3i to 2.70 hank roving, white work in first-class mills. Well recommended.

1260 **Young Man** who has worked up through carding rooms of some of the best mills in New England, wants position as overseer in New England or Middle States. Age 27. Not married

1238 **Second** hand of cotton carding. 37; married. Open for engagement.

1315 **Cotton Carder.** Over 20 years' experience as overseer in first class mills. At present employed. Well up on prints and light and heavy sheetings. Knows American and English cards, and sneeders. Best references.

1320 **Cotton Carder.** 12 years' experience as overseer in first class mills. Can refer to well known mill men. Age 39. Married.

WOOLEN SPINNERS.

1299 Woolen Spinner who has had experience as second-hand would like a position as boss spinner. Would accept small salary to start. Has worked on sloakings, dress goods and Scotch tweeds in New England mill.

1287 **Young Man** wants position as boss spinner. Experience in first-class mills on cassimeres, kerseys, cheviots, sattinets; knows Davis & Furber, Paul and Johnson & Bassett machines. Age 29. Wife works in mill.

1195 **Spinner, Woolen.** American; age 31; married. Experienced on yarns from 1 to 7 1-2 run. Refers to past and present employers. Wants position as overseer. Will not go to Southern States, Canada or Connecticut. Is an experienced overseer.

1112 **Overseer of Woolen Spinning** wants position. Has first-class references. Age 37. Wages reasonable. Will accept second hand's position.

1276 **Spinner,** woolen. Wool and shoddy from 1-2 to 10 run, cassimeres, flannels, dress goods, underwear and blankets. Davis & Furber, Furbush & Sons, Johnson & Basset, and Schmidt machinery. Good references.

1204 **Situation wanted** as boss spinner, or second hand and mule fixer on Platt mules. Many years experience on yarns for dress goods in England, and also yarns for fine woolen cloth. 35 years old and married; good references.

1316 **Overseer Worsted Drawing** and spinning. Will accept first class position at $3 or more per day. At present employed in well known and first class mill. Age 42. Married. Best references from former employers.

COTTON SPINNERS.

1284 **Eleven years as Overseer** in first-class gingham mill, with other experience, has fitted this man for good position in charge of ring spinning, spooling and warping. Age 40. French American; married.

1223 **Wants position as Overseer of** Spinning or Twisting, or both. Familiar with fine or coarse numbers. Refers to past and present employers.

1272 **Second Hand** of cotton ring spinning wants position in Massachusetts, Rhode Island, Maine or New York. Age 23; married.

1364 **Cotton Spinner, mules or frames** Early training in England, 5 years in New England mills, yarn 20s to 120s. Because of misfortune would accept second hand job. Excellent reference for character and ability. Age 32, married

1350 **First-Class Ring Spinning** overseer, also spooling, warping, slashing, web drawing; large experience, highest references as to skill, character and executive ability. At present employed in Fall River. Age 48, American.

1344 **Mule or Frame Spinner,** is at present employed in first-class print cloth mill in New England, where he has been for 9 years. Can take charge of room. Age 28, married; good references from present place. Wants $3.00 or more.

WOOLEN WEAVERS.

1340 **Worsted Weaver** would like position in a small mill at moderate salary; experience as fixer and in cloth room. Age 38, married. Knowles and Crompton looms; references good.

1253 **Weaver, Designer or Superintendent** Open for a position. Refers to past and present employers. Aged 47; married. Worsted cloakings, cassimeres and dress goods.

1130 **Overseer of Woolen Weaving** wants position. Would accept 2nd hand's position in a good mill. American; protestant; age 36; single. Good man on Knowles fancy and plain looms, also Davis & Furber. Cassimeres, worsteds, meltons and flannels. Will not go South, West or Pennsylvania.

1273 **Woolen** weaver wants position. Age 35; married. A first class man.

1313 **Woolen Weaver.** First class references, and experience on fancy cassimeres, kerseys, beavers, dress goods, etc. At present not employed, for good reasons. Age 44. Married.

140 **Worsted Weaving Overseer** with 12 years' experience as overseer, designer, and superintendent. Has tried another business for a few months and now wants to go back to the mill. Excellent references, habits all right. A skillful weaver and manager. Age 33, married, American.

COTTON WEAVERS.

1297 **Overseer of Weaving.** A man of the very best standing desires a permanent position in first-class mill. He has worked in several of the best mills in New England for upwards of twenty years, and can show splendid references. Has worked on sheetings, prints, sateens, fancies, lenos and plaids. Now unemployed.

1353 **Overseer Cotton Weaving**, who has worked up from fixer to overseer in good mills, wants position paying $3.00 or more. Scotch, age 29; experience on all kinds sheetings and sateens.

1334 **Jacquard and Dobby Weaver** and designer on Knowles machines. 8 years' experience in this position. At present employed and can furnish excellent references. Age 38; married.

1333 **Overseer of Cotton Weaving** with more than 20 years' experience in weave rooms of N. E. and Canadian mills. Experience on all kinds of white and colored, plain and fancy work, except Jacquard, American and English, looms. Married; age 37.

1288 **Overseer of Cotton or Worsted** weaving wants position. Familiar with all kinds of looms; plain or fancy work. Age 45; married.

1343 **Boss Weaver or Spooler** whose long experience as a manufacturer in England of all kinds of spread and fancies, and later in Canadian mills from sheetings to dress goods and Jacquard work, qualifies him for a first-class position; highest references. Can start immediately.

1247 **Elastic** weaver wants position as overseer. Used to cotton web, elastic suspenders, silk neckwear, dress goods and handkerchiefs. 29.

FINISHERS.

1351 **Woolen and Worsted Finisher** with 7 years' experience as overseer in R. I. and N. Y. mills, from which he has excellent references. At present second hand in one of the best worsted mills in N. E. Habits first-class; age 29, married.

642 **Knit Goods Finisher** at present out of employment because of change in superintendent. Englishman who learned his trade in Nottingham and has since been overseer 14 years in large Canadian and American mills. Married, age 46. First-class manager of help.

1359 **Woolen Finisher** of all kinds of woolen goods; 20 years in charge, at three leading mills. At present out of employment; expects $4.00 a day. Age 45, married; references first class.

1041 **Woolen Finisher.** Has had experience on fancy and piece dyed goods, cassmeretes, cheviots, worsteds, kerseys and dress goods. Wants position as overseer or second hand in New England States. Age 26 years. Will work for $2.50 per day.

1330 **Expert Finisher** with 10 years' experience in European mills. Can do perfect work on highest grade cassimeres, serges, cheviots, kerseys, worsteds, astrachans. Age 34; married. German, speaks English imperfectly.

DYERS.

1302 **Young Dyer** wants position as second-hand or overseer in small mill. Has been under good men in well-known mills.

1354 **Dyer of Large Experience** both in woolen mills and in job dye-houses. A man of far more than average skill from raw stock to piece dyeing, dress goods, etc. Scotch, married; age 39.

1355 **Wool and worsted Dyer,** a young man with 5 years' training by one of the best dyers at one of the largest mills in N. E. Experience on worsted and woolen cheviots, clays, worsteds, suitings, cloakings, beavers, dress goods, carriage cloths, yarn, slubbing, wool. Would be able to take charge of small high grade small plant.

1360 **Wool Dyer or Assistant,** 6 years' training as assistant on shoddy and wool piece dyeing. French American, age 24, single, well recommended.

1361 **Wool Dyer and Finisher,** large experience on blankets, all kinds of flannels, felts and dress goods Early training in Scotland, 15 years in this country. Now employed, but wants to locate in the North near the sea. Age 40, married; now giving entire satisfaction.

1327 **Skillful Dyer** with experience on raw cotton and wool, indigo blue vats, slubbing, worsted and woolen yarn, piece dyeing on ladies' dress goods and men's suitings. Age 45; married. First class references from good mills.

1319 **Boss Dyer.** Wool, cotton, or raw stock. Alizarine colors; shoddy, carpet yarns, straw goods, beavers. Blue-blacks all kinds of fancy dyeing and piece dyer. Belgian. Age 29. A thorough master of his trade.

1323 **Dyer** of large experience on cotton chain and skein work. Age 40; married. At present employed, but wants higher wages. References from good mills.

KNITTERS.

1257 Superintendent of knitting mill wants position; is a finisher and understands every part of the business, including shipping all kinds of goods, fabrics, cotton, worsteds, silks, wool on all kinds of shapes, and flat goods; most all kinds of knitting machinery and finishing machinery; age 32; married; refers to past record.

1274 A man who thoroughly understands the manufacture of hosiery from the fleece to the case, and is a good manager. Desires to correspond with parties wishing to employ such a man.

1362 **Boss Rib Knitter**, young man, now second hand in fleece lined underwear mill in New York State wants to advance. Very highly spoken of by present employers as to both ability and character. Could change on short notice.

1317 **Knitting Overseer.** Wide experience. Age 36. Not married. Has worked on fleece lined underwear, elder downs, stockinet, jerseys, etc. Familiar with spring needle circular machines. First class references.

1342 **Hosiery or Underwear Supt.** A practical knitter familiar with latch, spring needle, and sewing machines; nearly 15 years superintendent of New England hosiery mill, at present shut down. Good manager; references first-class. Age 47; married.

1066 **Knitter.** Age 25; single; underwear, cotton and worsted; references.

1274 **Hosiery** superintendent wants position; married. Long experience on men's, women's and children's woolen hosiery.

DESIGNERS.

1275 **Designer** or assistant. Age 25; married. A good man on cotton or worsted fancy dress goods. Jacquard and box looms.

1263 **Assistant** Designer or Assistant Superintendent. Has received a practical mill experience, and is a graduate of the Philadelphia Textile School. Unions, cassimeres, suiting, cloakings. Age 24 years.

1252 **Designer, Weaver or Dresser.** Aged 40 years; married. Familiar with nearly all kinds of men's wear, piece dyes, etc. Refers to past and present employers.

1259 **Woolen Designer or Supt.**, 10 years' experience on meltons, kerseys, beavers, and dress goods. Thorough knowledge of color mixing and picking out. Best of references from past positions. Age 39, single.

1326 **Graduate Phila. Textile School** wants position as assistant superintendent or designer in cotton mill. Has also had 3 years' practical experience in mill. Very highest references.

1329 **Accountant or Secretary** thoroughly competent to assume full charge of any set of private, partnership or corporation books. Would take small amount of stock in Southern cotton mill and act as secretary and accountant. Temperate, energetic, excellent references. Age 36; married.

9999 **Superintendent Print Works.** Young man, 30 years of age, energetic and practical, graduate chemist, with thorough experience in printing, especially of silk (3 years in Europe and 4 in this country), seeks position as superintendent or assistant in print works. Address Chemist, care TEXTILE WORLD.

MISCELLANEOUS.

1365 **Assistant Supt. Underwear Mill.** Experience mostly on flat goods, is an expert bookkeeper, understands making cheap goods, finishing, and general knowledge of machinery. Moderate salary. Age 39, married, American.

1301 **Book-keeper and Paymaster.** Young man of the very highest character desires to move away from the Atlantic coast, on account of his health. Best references from his present and former employers.

1283 **Laboratory Chemist** with experience in large mills and supply house desires position. A moderate salary.

1336 **Beaming and Slashing.** Experience in Mass. and Me. cotton mills on ginghams, dress goods and all kinds colored goods. Age 30; habits first-class, good references. At present employed in large mill.

1335 **Loom Fixer or Second Hand.** Knowles and Crompton looms, fancy worsteds and cassimeres, dress goods. German; Protestant; age 37, married. Has been employed in good mills and is very well recommended.

1345 **Master Mechanic.** In charge of one large plant for past 16 years, and previous to that 6 years in charge for one of the largest mills in New England. Capable of accomplishing best results at low cost; references from leading engineers and managers.

1346 **Chemist or Salesman.** Graduate Crefeld Textile School, colorist for German manufacturers, and since employed for 3 years in this country as colorist. Young man, single.

1341 **Dye-Stuff Salesman**, with experience in dye house for several years; many friends and relatives as dyers. Would start on small salary and expenses. Age 30, single. Might take second hand job in dye house.

1312 **Overseer Dresser.** Age 34. Married. Is at present working in a first class mill. Desires to change because of poor health of family. Can furnish first class references. Cassimeres, unions, woolens.

1363 **Twisting, Spooling, Warping** overseer. Experience on single and twisted yarns up to 2/100s in one of the best New England mills. Now employed as assistant; young man, but is confident that he could satisfactorily fill overseer position.

1356 **Second Hand Cotton Spooling**, warping, twisting, slashing, or could handle overseer position in small mill. Well recommended, now with good mill.

1202 **Silk Superintendent** is open for an engagement with a first-class company. Has a thorough knowledge of all the details connected with the manufacturing of silk ribbons and hat bands, from throwing to the finished product. Has held the position of superintendent of a first-class mill for several years. Under 30 years of age, and married. Has the best of references. For any further information address this paper.

1229 **Dresser.** Overseer of woolen dressing. Age 30. Men's wear and dress goods. Good references.

1228 **Shearer.** Wants position as overseer of shearing. Good man on cassimeres, worsteds, unions and cheviots. Age 25; married. References.

TEXTILE BOOKS.

The following are recent publications, which we will furnish upon receipt of their price.

Plain Series of Cotton Spinning Calculations, by William H. Cook, 91 pages.

This book gives original calculations relating to cotton spinning, giving the position of the different pulleys and wheels, which are taken into consideration when making calculations, and also points where the necessary changes are made when altering from one count to another. Price $1.

The Student's Hand-Book of Practical Fabric Structure, by H. Neville. 8vo., 235 pages.

The object of this work is to interest the student in the subject of weaving by a series of consecutive lessons in the principles of fabric structure. Free use is made of sectional diagrams, to show what actually takes place in producing any particular fabric. An idea may be had of the nature of the book from the following partial enumeration of the subjects treated: Design Paper and Its Uses; Plain Cloth and Its Ornamentation, Twilling, Drafts and Tie-ups; Spotting; Open-work Effects; Cords; Pile Weaving; Cross Weaving; and Backed and Double Cloth. Price $2.25.

The Printing of Textile Fabrics, by C. F Seymour Rothwell. 8vo., 312 pages.

This is a practical manual on the printing of cotton, wool, silk, and half-silk fabrics, with plates, illustrations in the text, and specimens of printed fabrics. The work contains but little information of a purely chemical or theoretical character, as it has been covered by the "Manual of Dyeing," by Knecht, and others. The author has confined himself more to the practical side of the subject, and the processes and machinery described by him are principally those with which he has had practical experience. Price $6.50.

Cotton Spinning, by W. S. Taggart

Two volumes of this work have been issued; the second volume brings cotton spinning down to the end of what is generally termed the preparing processes and includes all of the machinery and manipulations between the card and the self-actor, or ring frame. This work is esteemed of much assistance to the student. Price $1.75.

Ornamental Design for Woven Fabrics, by Stephenson & Suddards. 273 pages, 66 illustrations.

This is a text book dealing with ornamental design for woven fabrics, for the use of the student, and has been written for the purpose of suggesting helpful ideas to designers and manufacturers of textiles, and aims at bringing artistic textile work into practical touch and closer relationship with the technical requirements of manufacturing. It takes up such subjects as Geometric Design; How to Plan an All-over Repeating Design; The Drop Pattern; The Sateen Arrangements; Borders, Corners, Stripes; The Structure of Ornamental Flowers, Foliage, etc. Price $2.50.

The Power Loom, by Alexander Brown

This is a practical, well written treatise of 118 pages, on the construction of the power loom and the art of weaving, giving descriptions of the texture produced by different numbers of harnesses. The text is illustrated with diagrams, and contains calculations and instructions for the production of cotton, woolen, linen and jute fabrics. It was written with the intention of serving as a text book for those engaged in the trade. Notwithstanding it relates to English machinery, it is of value to those operating that of American make. Price $1.25.

Jacquard Weaving and Designing, by T. F. Bell. 300 pages. Fully illustrated.

The contents of this work have been derived from a long course of art and technical training, together with a lengthy practical experience in textile manufacturing and designing, by the author. The descriptions are as concise as is compatible with fairly clear explanation. Price $3.00.

Cotton Weaving and Designing, by John R. Taylor, 288 pages, fully illustrated.

This work is by a well known writer and lecturer on this subject, and treats of such topics as: Hand and Power Looms; Drop and Circular Box Looms; Dobbies; Jacquard and Leno Weaving; Terry Looms; Principles of Designing, Plain and Figured; and Textile Calculations. This work is of much value. Price $2.50.

Woolen Spinning, by Charles Vickerman.

This is a most excellent work for students in textile schools, and for skillful, practical men in woolen mills. It takes up the principles that underlie the various processes and operations of the earlier parts of manufacture. It has chapters devoted to Wool; Wool Sorting; Scouring; Bleaching; Mixing, etc., Carding and Spinning. 352 pages. Price $1.75.

The Student's Cotton Spinning, by Joseph Nasmith.

This is a standard book on spinning. It treats of mixing, opening, scutching, carding, card clothing, combing, roving, spinning, reeling, waste spinning, etc. 593 pages. Price $2.50.

Technology of Textile Design, by E. A. Posselt.

As a practical treatise on the construction and application of weaves, and the analysis of cloth, this is, in very many respects, the best work for the American manufacturer that is published. Price $5.00.

The Mechanism of Weaving, by T. W. Fox.

A treatise of 464 pages, presenting exact and practical information upon the principles of weaving. Takes up such topics as Harnesses; Shedding; Dobbies; Jacquards; Card Cutting; Picking; Pickers; Swivel Weaving; Beating Up; The Reed; Taking-up Motion; Temples; Trimming and Fixing of Parts. 256 illustrations. Price $2.50.

Manual of Dyeing, by Knecht, Rawson and Loewenthal. In three volumes.

Decidedly the best work of the kind for a proper understanding of the present state of the art of dyeing, for the use of practical dyers, manufacturers and students. It takes up such subjects as, Water; Acids; Alkalies; Mordants; Natural and Artificial Coloring Matter; Machinery used for dyeing, etc. Has numerous illustrations and specimens of dyed fabrics. Price $15.00.

Southern Cotton Mill Bonds and Stocks.

The best paying investments with the least element of danger—netting investors 6 to 8 per cent. free of taxes.

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We refer to the banks in Raleigh.

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Cash paid for uncancelled printed or addressed postal cards that have been laid aside by business houses as of no further use.

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WARPS, COPS, TWIST and SOFT SKEINS, Single, Double, 3-ply, 4-ply, etc.

COLORED YARNS for HOSIERY

on Cones, a Specialty.

Correspondence Solicited.

EDWARD S. HYDE, 223 and 225 Chestnut Street, PHILADELPHIA PA.

Kerseys for the Army.

The United States government opened bids on Monday, May 2, for 150,000 yards of sky-blue kerseys. The following is the list of bidders.

John Wanamaker	25,000 yds.	at $1.44
John Wanamaker	25,000 yds.	at $1.49
John Wanamaker	25,000 yds.	at $1.54
John Wanamaker	25,000 yds.	at $1.59
Conshohocken	50,000 yds.	at $1.39
Conshohocken	50,000 yds.	at $1.37½
Peck	5,000 yds.	at $1.35
Peck	5,000 yds.	at $1.40
Peck	5,000 yds.	at $1.45
Peck	5,000 yds.	at $1.50
Peck	5,000 yds.	at $1.55
Peck	5,000 yds.	at $1.60
Pippey	30,000 yds.	at $1.46
Sullivan Vail & Co ..	40,000 yds.	at $1.41¾
Sayles Jenks Mfg. Co.	25,000 yds.	at $1.70
Sayles Jenks Mfg. Co.	40,000 yds.	at $1.65
Sayles Jenks Mfg. Co.	35,000 yds.	at $1.65
Ross Textile Mfg. Co.	15,000 yds.	at $1.65

Wanamaker's bids were awarded. It is our impression that his goods are, or will be, made by the Burlington Woolen Co. The Conshohocken Mills were awarded the bid for 50,000 yards at $1.37½, but not their other bid, on account of delivery. Peck & Pippey are professional bidders. The bids on blouse linings 6/4 flannel, all wool, were made by the Slater and Middlesex Mills, and the price ranged from 78 cents to $1.20. The Middlesex Mills were awarded the bids at from 79 to 89 cents.

—Georgia, Jackson. The Pepperton Mills have stopped their weaving department and their entire product is now yarns on combs.

THAD. S. COBB MACHINERY CO.

COTTON and WOOLEN MACHINERY.

Belting, Card Clothing & Mill Supplies.

192-194 Middle St., Lowell, Mass.

Wanted—August, '97.

A few copies of August, 1897 number of TEXTILE WORLD are wanted. 50 cents each will be paid or credited on subscription account as may be preferred. Send postal before sending in. TEXTILE WORLD, 620 Atlantic Avenue, Boston.

Knitting Mill in Virginia.

Practically new. Equipped with first-class machinery for making ribbed underwear. Upper story is vacant; Boiler and Engine room are in separate addition. Labor and shipping facilities good. Will sell the machinery and lease the real estate to parties who wish to continue the business, and will make very favorable terms. Address P-162, care Textile World, Boston.

Expert Carbonizer Wanted.

A man who is thoroughly acquainted with the dry process, and make himself generally useful in a carbonizing plant located in the western part of Mass.

Address O. F JAY, Box P 163, care Textile World, Boston.

EDWARD JEFFERSON & BRO.,

Worsted .·. Machinery,

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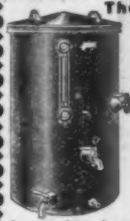

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With 12,000 to 18,000 square yards floorage
Apply, J. A., Textile World.

Newport (Tenn.) Cotton Mill For Sale.

Sale to be May 18, 1898.

The building is a heavy brick structure, 40 x 200, four stories high; the Dye House 40 x 60 and Engine and Boiler Buildings are of frame, covered roof and sides with iron.

The engine is a Frick and Co. Corliss of 130 H. P.; 2 Erie City Boilers, 80 H. P. each.

The looms are of the Bridesburg & Knowles pattern, 192 in number, with quillers and beams sufficient for service.

The Dye House is equipped with Dyeing and Drying machines sufficient for 500 or more looms. The building will accomodate 100 more looms.

Sold separately or together.

Newport is the county seat of Cocke County, Tennessee, situated in a beautiful, fertile and healthy section. Labor abundant and cheap. Living as cheap as anywhere in the entire South. The mill is situated on the main line of the Southern Railway running direct to Washington.

Any further information will be cheerfully given by

JOHN W. FISHER, Special Commissioner.

Wanted—Two Young Men.

Fully acquainted with the knitting business, who can furnish $10,000 capital, to unite with the proprietor of a fully equipped 8 set mill in running the same. Very favorable terms will be made with men of exceptionably good character and standing. Reference required. Address

A. P. L., Textile World.

MACHINERY

Shafting, Hangers, Pulleys and Couplings. Machinery Steel in all sizes from 6 1-2 inches diameter down to 3/16 inch diameter, cut any length, always in stock. Cold Rolled Rounds, Squares, Flats, Hexagons, Octagons, Decagons, and all shapes finished to exact sizes. Everything in readiness to be shipped at once. Our goods are without a rival and our prices the lowest of all.

Telephone 314, South Boston.

COMPRESSED STEEL SHAFTING WORKS,
South Boston, Mass.

ONE-HALF A MILLION PEOPLE WILL VISIT THE TWENTIETH Triennial Exhibition

OF THE

Massachusetts Charitable Mechanic Association,

OCTOBER and NOVEMBER, 1898.

Textile manufacturers are invited to exhibit their specialties. Electrical apparatus will be made a special feature. All machines will be electrically driven. Preference will be given to parties desiring to present working exhibits. Entrance fee, Five Dollars for mechanical exhibits. No charge for space or rental. Power furnished free. Prospectus, rules and conditions and floor plans on application to HENRY D. DUPEE, Mechanic's Building, Boston, Mass.

Expert German Finisher Wanted.

A man who is thoroughly acquainted with German finishing machinery and German finishing methods. Prefer one with a thorough knowledge of machinery. One who can operate as well as design and furnish information. Address in confidence,

G. F. care of Textile World.

Factory with Water Power For Sale.

Hudson River, 42 miles from N. Y.; vessels load at mill door; West Shore RR. crosses premises; ten acres; extensive dock; mill five floors, 40 x 60; power heavy and unfailing; desirable for business needing cheap power and transportation; a bargain. Apply to owner

W. C. ANTHONY, Newburg, N. Y.

Water Power in Georgia.

For Sale: A fine water power (estimated twelve thousand horse) and 540 acres of land, about 100 miles from Atlanta, Ga. Railroad, Express and Telegrap service; a clear mountain stream suitable for bleaching. For full particulars address

S. S. RAMBO, Tallepoosa, Ga.

Hosiery Mill For Sale or To Let!

A new plant, capacity 100 dozen per day.

Water Power To Let, 400 H. P., with excellent buildings.

W. K. DANA, Westbrook, Maine.

Frank A. Stevens, *Pres.* Arthur H. Mason, *Treas*
Capital Stock, $500,000.

Sanford Spinning Co

FALL RIVER, MASS.

30,000 Spindles. Weekly product, 50,000 pounds 14s to 40s.

NOVELTY COTTON YARNS,

FROM AMERICAN PEELERS AND EGYPTIAN COTTONS.

OUR SPECIALTY: Superior qualities of Hosiery Yarns, Natural Shades of Cottons, and in Colors, Jaegers, Mixes, and Bleached, Hosiery Cops on Long Tubes, Skeins, Tubes, Cones and Lisle Thread Yarns. Furnished in Carded and Combed Qualities in Singles, 2, 3 and 4-plies.

The Best is the Cheapest.

It is BETTER and CHEAPER to wind yarn by the "Universal" system before shipment from the mill, thus insuring perfect delivery to knitting machines without rewinding.

UNIVERSAL WINDING CO.,

F. H. BISHOP, Manager.

226 Devonshire St., - Boston, Mass.

YARN DEPARTMENT.

Eastern Yarn Market.

Cotton Yarn. Spinners continue busy with prices advancing. Deliveries are beginning to be made for heavy weight underwear, and many orders have been placed. The knitters, many of them, who generally use wool are now running cotton yarn. The hosiery manufacturers are using considerable yarn, as the buyers are not willing to place orders for either woolen or worsted hosiery. The sizes used are 1/10s to 1/12s, mostly white cop, also Jaeger and other mixtures. This trade will be much better, as the demand comes later in the season. The weavers are using tons of cotton yarn in 2/24s, 2/30s and 2/40s. The price of this yarn keeps advancing, although raw cotton continues lower. The fleece lined underwear continues in good demand. The sizes of yarn used for the backing are from 5s to 7s, and on the face 1/24s and 1/30s in colors. The ribbed underwear is selling both in men's and ladies'. The men's garments call for 1/10s Jaeger, and ladies', 1/7s and 1/9s silver gray. Many of the knitters on this class of garment are running until 9 o'clock to get production. The balbriggan in light weight is about over. The sizes required range from 1/40s for two threads, and 1/20s for single threaded garments. Egyptian yarn is sold at advance prices although cotton continues lower. The heavy weight season is calling for much yarn. The combination of cotton spinners continue to advance prices. Taking things altogether, the yarn spinners have never been in a more prosperous condition. The money market is having a tendency to curtail business. Undoubtedly the example set by the spinners has induced the knitters to attempt combinations of their own. This combination we predict will not be a success. Full rough Peruvian cotton continues scarce, and the small lots offered are quickly secured at high prices. The knitters and manufacturers of cloth are buying much of this class of cotton.

We quote:

7/8 white cops	13½ cts.
10s " "	14 cts.
12s " "	14½ cts.
14s " "	15 cts.
16s " "	15½ cts.
18s " "	16½ cts.
20s " "	17 cts.
Silver gray and Jaeger.	
10, 11, 12	16 cts.
14	16½ cts.
16	17 cts.
18	17½ cts.
20	18 cts.
Combed Egyptian, 1/20,	24 cts.
" " 1/30,	30 cts.
" " 1/40,	34½ cts.
" " 1/50,	37 cts.

Woolen Yarn. Spinners of woolen yarn are getting but few contracts. Some sample orders have been placed, but little business has resulted. Some sweater yarn has been sold, but the prices are so low that buyers are furnishing stock and spinners are working on commission. We note that orders for underwear are being placed by the various state governments. One order has been placed by the Commissary Department of the State of Connecticut for the State troops, for 2000 pieces, and more is wanted. The knitters in Bennington, Cohoes and Connecticut are, as a whole, slack, but there are five or six manufacturers who continue busy. Notwithstanding this fact, however, they are buying no wool, and have stocks enough to last until January 1st. Salesmen know this, and, in consequence, few are traveling. On the 11th of April, many of the knitters received a telegram requesting attendance at the Gilsey House, New York, at 9.30, April 12th, on business of greatest importance. It is assumed that those without orders were in attendance. Those with plenty of orders in hand did not attend, as it was generally considered a scheme on the part of knitters out of orders to devise some method whereby

(Continued on page 131.)

Frank E. Patterson, Prest. Oscar W. Wood, Treas

GERMANTOWN SPINNING COMPANY INCORPORATED GERMANTOWN JAN. 9TH 1890

Germantown Spinning Co.

COTTON CARDED

HOSIERY YARNS

In numbers from 6s to 26s.

Germantown, Philadelphia.

Glazed, Bleached and Dyed

YARNS

Cone Winding.

W. WARREN THREAD WORKS.

WRITE US WHAT YOU USE, WE WILL DO THE REST.

WESTFIELD, - MASS.

WOOLEN YARNS.

Single, also Double and Twist For Weaving Hosiery.

COVERT CLOTH YARNS A SPECIALTY.

Raw Stock and Piece Dyeing.

CLEAR RIVER MILLS,

PASCOAG, R. I.

(Continued from page 129.)

they could get, somehow, some business.

The knitters with established reputations are doing best these days. Hosiery manufacturers do not like the plaid hosiery now being placed on the market. It is said the Germans got this class of stocking up in order to hold the American trade, and that even now buyers are tired of them. The cheapest class of underwear and hosiery outside of certain well known brands is selling best. The cry of the buyer has been for garments which could be gotten up without material advance. Buyers are beginning to see the folly of trying to force trade on customers, and are buying better goods. Spinners are very much discouraged over the fact that the manufacturers are not buying yarn, and many outlets for yarn have been destroyed, either by failure, or by manufacturers putting in spinning. Many weavers also purchased large amounts of yarn before wool was advanced, and are therefore out of the market. The spinners hope that we shall, after all, have a good business later, as they well remember that in 1894 the heavy weight season did not open until August, and whatever happens once may again. New Hampshire hosiery manufacturers are not making as fine a quality of hosiery as was made before the duty was placed on wool. The shoddy hosiery of Lakeport is being replaced with cotton hosiery.

Worsted Yarn. Business is dull, and without cause when viewed from the actual conditions. What are the facts? We have a protective tariff which gives us the American markets. We can sell manufactures of wool cheaper than foreigners can import and sell at, and consequently importations have stopped. Why should there be any weakness in the situation? What spinner or dealer can duplicate his holdings of wool at the prices he is willing to sell for?

A large Rhode Island weaver told the writer that he had orders to last un-

(Continued on page 133.)

CATLIN & CO.,
YARNS.
67 Chauncy St., Boston
216 Church St., New York.
206 Chestnut St., Philadelphia.

ALEX'R KING & CO.
YARNS.
FINE IMPORTED YARNS A SPECIALTY.
54 Leonard St., New York.

JAMES E. MITCHELL & CO.,
Commission Merchants.
122 & 124 Chestnut St., Philadelphia, Pa.
51 & 53 Summer St., Boston.
Cotton, Woolen & Worsted Yarns.
All numbers on Hand and Made to Order.

O. S. HAWES & BRO.,
WEAVING and HOSIERY **YARNS,**
All Plies and Numbers.
Imported Yarns a Specialty.
82 and 84 BEDFORD ST., FALL RIVER, MASS.

TUCKER & COOK MFG. CO
MANUFACTURERS OF
WHITE AND COLORED COTTON **WARPS**
Nos. 6s to 30s,
On Beams, Jack Spools or in Chain
CONWAY, MASS.

GRANT YARN CO.,
COMBED AND CARDED COTTON
YARNS 42s and above. AND
FITCHBURG, MASS. **WARPS**

E. JENCKES MFG. CO.
Colored Cotton, Hosiery, Woolen and Merino **YARNS**
PAWTUCKET, R. I.

LINEN YARN IMPORTER.
Hughes Fawcett, 115 Franklin St., New York,
Flax, Hemp & Jute Line and Tow Yarns,
FOR WEAVING PURPOSES
Linen Jacquard Harness Twines.
Fine Cotton Harness and Heddle Twines.
For Cotton, Silk, Woolen and Carpet manufacturers. Correspondence solicited. Samples promptly furnished.

CAPACITY, 50,000 Spindles. **ORSWELL MILLS** FITCHBURG MASS.

COMBED OR CARDED

COTTON YARNS

In Chains and Skeins, on Balls, Beams, Spools—single or twisted.

The J. R. MONTGOMERY CO.,

WINDSOR LOCKS, CONN.

Mercerized Cotton Yarn in two or more ply. Gives a permanent lustre equal to spun silk.

Novelty Yarns, Mohair Loops, Cotton Flake and Nub Yarns.

High Grade Cotton Warps, in colors, on beams, in chain warps or in skeins, single or two-ply.

Printers of Cotton, Wool, Worsted or Silk Yarns.

PLAIN AND FANCY PATTERN

Cotton Warps,

WHITE, MIXED AND COLORED.

For SATINETS, BLANKETS, ETC.

WHITTIER COTTON MILLS,

LOWELL, MASS.

INDIAN ORCHARD CO.,

Indian Orchard, Mass.

MANUFACTURERS OF

Lustred Cotton Yarns.

In Various Colors and Twists.

NOVELTY YARNS

In Cotton, Silk and Worsted, in various patterns and colors.

Cotton Warps and Yarns

In Gray and all colors, single or 2, 3, 4 and 6-ply, and Cable Cord.

COLORED COTTON

Machined, Carded or in Roving.

(Continued from page 131.)

til June 1st, and then should shut down, as he considered it bad policy to lower the price of his cloth. Business in Rockville continues bad, and it is reported that the Washington Mills are shutting down for lack of orders. Worsted yarn is off very much in price. Price is no inducement at this stage of the game, as no one wants to buy, and the only good it does is to make those who have purchased yarn at a higher price sick. The spinner who shuts down his mill and waits until the tide turns is the wise man. There can be no doubt that we must make more cloth for the heavy weight season, as 50 per cent. of the orders placed in the early part of the season were cancelled. The only mills running today are those selling cotton worsteds, and the percentage of worsted yarns, as compared with the percentage of cotton yarns, is very small. To show this we quote a manufacturer who is building an addition to his mill. He says we are using 1000 pounds of cotton yarn per day, and 200 pounds of worsted yarn per day. This mill formerly used worsted yarn exclusively. Those buying this manufacturer's cloth are getting it at old prices, but instead of getting worsted cloth they are getting cotton cloth made on a worsted cloth basis. Notwithstanding this condition of affairs weavers are cutting prices. Of course lower prices means a greater percentage of cotton. As some goods are made today, we might as well buy canvas for cloth, as the only part of the fabric which is wool is a thread of worsted thrown on the surface. We believe that a better business is being done in French spun yarn than Bradford spun. Hosiery manufacturers are placing some orders and underwear knitters are beginning to buy. The sizes used are 1/14s, 1/26s, and 1/32s for hosiery, and 1/40s for underwear. Dress goods manufacturers are beginning to make inquiries for 2/36s, and some business is being done in Astrachan lustre stocks. The season is late,

(Continued on page 135.)

KERR THREAD CO.
—SPINNERS OF—
Fine Combed Sea Island **COP SINGLES**
All Numbers, 30s to 150s.
Fall River, Mass.

WOOLEN AND MERINO YARNS.
Special line for Bicycle and Golf Goods in all shades
For Hosiery, Gloves, Underwear, and all kinds Knit Goods. Cop, Cone and Skeins.
The J. & H. Clasgens Co.
New Richmond, O.

WOOLEN YARNS.
All grades Woolen, Mixed and Merino yarns.
15 SETS CARDS.
EDWARD M. ROCKWELL,
LEOMINSTER. - MASS.

A. HERBST. J. W. JONES.
HERBST & JONES,
Successors to Kershaw Worsted Co.
WORSTED YARN SPINNERS,
21st & Naudain Streets,
PHILADELPHIA.

C. MOORE & CO.,
MANUFACTURERS OF
TWINES, THREADS AND YARNS.
Jacquard Harness Twines of all kinds on hand and made to order.
S.W. COR. FIFTH & MARKET STS.,
Philadelphia.

EICHMANN & STERNBERG
530 Broadway cor. Spring St., NEW YORK.
Plain and Gassed Cotton Yarns,
HOSIERY COTTON YARNS,
Mercerized Cotton Yarns (Simile).

COTTON WARPS
White or Colored.
Toweling and Grain Bags.
Dana Warp Mill,
WESTBROOK, MAINE.

ALBERT R. ELSASSER,
Clifton Worsted Mills.
Lustre Worsted Roving and Yarns
A SPECIALTY.
MILLS: ADDINGHAM, DEL. CO. PA.

HADLEY
SPOOL COTTON AND FINE YARNS
COMPANY
COTTON SPINNERS.
MILLS AT HOLYOKE, MASS.

SPINNERS OF
FINE COTTON YARNS
30s TO 100s.
Gray, Bleached, or Colored. On cop, in skein on spools, cones or tubes.
Fine Cotton Warps, single and two-ply, in chain, etc.
Spool Cotton and Seaming Thread.
95 Milk St., BOSTON.

THE WILLIAM CLARK COMPANY,
WESTERLY, R. I.
Mills equipped with the latest and most improved machinery.
Combed Egyptian from No. 20s to 100s. Combed Sea Island from No. 40s to 200s.
Also 2, 3, 4, 5 ply and 6, 9 and 12 ply cable laid.
Hosiery Yarns on Cops Tubes or in Skeins, Grey, Bleached or Dyed. (Fast Colors.

GREENE & DANIELS MFG. CO.,
COMBED, CARDED AND GASSED
Yarns, Threads, Twines and Chain Warps,
Colored and Bleached Yarns Furnished in any manner desired by the trade. PAWTUCKET, R.I.

AMERICAN SPINNERS'
Cotton Yarn Exchange.
COMBED AND CARDED COTTON YARNS
From Northern and Southern Mills.
ARNOLD B. SANFORD, - MFRS. AGENT,
226 Devonshire Street.
BOSTON - - - - MASS.

Cotton Yarns AND WARPS Of Every Description.
James F. White & Co.
COMMISSION MERCHANTS,
54 an 56 Worth St., NEW YORK.
228 Chestnut St., PHILADELPHIA.
BURLAPS all WIDTHS and WEIGHTS.

YARNS All Numbers and Qualities.
HOLLAND & WEBB,
487 Broadway, New York.

NEW ENGLAND THREAD CO.
PAWTUCKET, R. I.
Manufacturers of Spool Cotton & Supefine Tapes
Thread and Yarn on Tubes and Cones for the Hosiery trade etc. Thread dressing a specialty, for weaving purposes. Dyers and Bleachers of Threads, Yarns and Tapes.

A copy of the Textile World's Directory is presented to every paip-up subscriber of the Textile World, with the compliments of the publishers.

Continued from page 133.

but we will undoubtedly do better as the seasons are getting later each year. The bunting manufacturers are having a good trade for flag material, and we may need much more by next month. Prices are largely nominal and concessions are made by spinners who wish to run their machinery.

We quote:

2/40s Australian	$1.07½
2/50s "	1.15
2/20s, 3/8s Blood	.60
2/36s, 1/2 "	.75

The Philadelphia Yarn Market.

Cotton spinners are still well sold up, and for a long time ahead. Nearly all sorts of yarn are being delivered promptly, especially in the knitting trade. Manufacturers of woolen goods complain that they are receiving hold-ups on orders and some cancellations. This will doubtless affect cotton warps to some extent, as they are coming in freely now, especially 2/20s. The upholstery trade is also dull. The war scare has certainly influenced trade to some extent, but it is expected that business will keep good, and absolutely improve if a settlement is finally declared, without war. Worsted yarn mills are dull. Manufacturers are careful about taking yarn ahead of actual requirements in this line, as they expect cancellations.

Two ply warps have been specially scarce; particularly 2/20s, 2/30s, 2/40s, and 24/2.

We quote:

WARPS.

20/1	13 to 13½
22/1	13½
26s	14½
12/2	14
14/2	14 to 14½
16/2	14½
14/1	12½
16/1	12½ to 13
20/2	15½ to 16
30/2	19 to 19½
30/2 Eastern	19½ to 20
40/2 Eastern	25 to 26

(Continued on page 137.)

B. F. BOYER & CO.,
Successors to GEORGE SHIMER & BOYER,
HOSIERY YARNS,
In Wool, Merino and Worsted.
GOLF YARNS,
In Wool and Worsted. Also carry a full line
BUNDLE YARNS
For the Jobbing Trade.
516 Market St., Philadelphia.
MILLS, CAMDEN, N. J.

Walcott & Campbell Spinning Co,
IROQUOIS MILLS.
FANCY HOSIERY YARNS
IN ALL COLORS.
New York Mills, Oneida Co., N. Y.

Eddy & Street,
COTTON, YARNS WORSTED,
WOOLEN, AND SPUN SILK.
BRAIDS
PROVIDENCE, R. I.

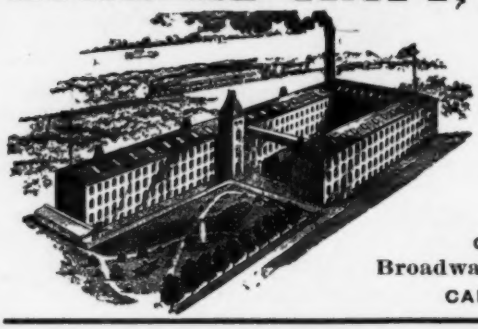
Cohannet Mills,
TAUNTON, MASS.
Spinners of High Grade
HOSIERY YARNS OF EVERY DESCRIPTION.
Selling Agents JAMES E. MITCHELL & CO, Philadelphia and Boston.

BURNET & CO.,
24 George Sq., Glasgow, Scotland.
All numbers and qualities of Cotton Yarns, specialties in
"Silkoline," "Ramie" and Fancies; also bleached filling on long tubes. Turkey reds, etc. A B C Code used. Telegraphic address "Tenrub, Glasgow."

O. H. HAYES & CO.
Will make liberal arrangements with Woolen Manufacturers to handle their productions.
O. H. HAYES & CO.

MONUMENT MILLS,
Manufacturers of
White, Colored, Fancy and Double and Twist, COTTON WARPS
HOUSATONIC, MASS. 4s to 60s.

HOWLAND CROFT, SONS & CO.



LINDEN WORSTED MILLS.

Fine Worsted Yarns

OFFICE AND MILLS:
Broadway and Jefferson Avenue,
CAMDEN, NEW JERSEY.

ALLEGHENY WORSTED MILLS,

Thomas Wolstenholme, Sons & Co., MANFRS. OF

ALL NUMBERS SINGLE AND TWO-PLY,

Worsted YARNS,

Sell Direct,

on Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural & Fancy Mixes.
Office and Mills: Frankford Ave. and Westmoreland St., Phila., Pa.

CRANSTON WORSTED MILLS.

Worsted and Mohair Yarns—white or colors, in skeins, on spools, cones, or shuttle bobbins.

NOVELTY YARNS—of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making Yarns only.

CENAPPED YARNS of all kinds. Doup Yarns. Harness Yarns for Braids, etc.

BRISTOL, R. I.

George Campbell & Co.

Worsted Spinners.

Yarns, both French System and Bradford.

Knitting Yarns in all Grades and Mixes.
All Numbers to 60s.

21ST STREET AND WASHINGTON AVENUE, PHILADELPHIA.

MALCOLM MILLS CO.,

MANUFACTURERS OF

Novelty Yarns, Silk Noil Yarns, in Fast Colors AND White.

Mills, Frankford, Pa. Office, 239 CHESTNUT ST., PHILA.

(Continued from page 135.)

SKEIN.

26/1	13½ to 14
20/1	13½
19/1	13 to 13½
4s to 10s soft	11½ to 12½
12s soft	13 to 13½
20/2 medium	15½
14/2	13½ to 14
30/2	19
30/2 Eastern	19½
26/2	17 to 17½
40/2	23½
8/3	11½
10s double reeled	12 to 12½
16/3 slack	14
16/4 slack	14
16/2 slack	14 to 14½
9/4 slack	12

SOUTHERN CONES.

6s to 8s, various qual.	12 to 12½
10s " "	13 to 14
12s " "	14
14s " "	14½ to 15
16s " "	15 to 15½
20s " "	16
24s " "	16½ to 17
26s " "	17 to 17½

SHUTTLE COPS.

6s to 8s	12½ to 13
12s	13 to 13½
16s	13½
26s	13½ to 14
40s	18 to 19

MIXED COLORED CONES.

6s to 8s	13½ to 14
10s	14 to 15
12s	14½ to 15
14s	15 to 15½
16s	16

Egyptian, carded 4 to 5 above white.

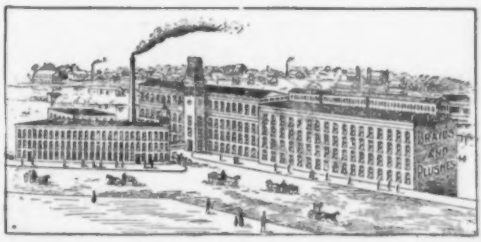
Combed yarn 4 to 5c. above carded.

Woolen and merino extremely dull, as the majority of manufacturers using such yarn, spin their own stock.

SILK NOILS AND SILK NOIL YARNS
IN WHITE AND COLORS.
MOHAIR LOOPS, KNOTS, AND FANCY YARNS FOR DRESS GOODS AND CLOAKINGS.
A. T. SKERRY & CO., 47 LEONARD ST., NEW YORK.

THE PHOENIX MILLS CO.,
MANUFACTURERS OF
Fine Worsted Yarns.
Correspondence Solicited. Samples furnished on application.
BOSTON OFFICE: 620 Atlantic Ave. Rooms 10 and 11.
MILLS: 10th & Germantown Ave., Phila. Chester, Pa.
PHILA. OFFICE. No. 13 LETITIA ST.

GEORGE SHIMER & SON,
Spinners of Worsted Yarn for the Weaving and Knitting Trade.
All kinds of Fancy Yarns for the Knitting Trade.
5th and Erie Sts., Camden, N. J.



FLYER SPUN
Mohair and Worsted
YARNS.
Mohair Plushes,
Worsted and Cotton Braids.
D. COFF & SONS, Pawtucket, R. I.
ESTABLISHED 1861.

CHENEY BROTHERS,

SILK MANUFACTURERS.

ALL KINDS OF

Knitting Silks, Ribbons AND Piece Silks,

USED FOR TRIMMING KNIT GOODS.

TRAMS, ORGANZINES and SPUN SILKS, in the Hank, or on Spools or Cones, for Manufacturers' Use. Silk for Special Purposes Made to Order.

MILLS: South Manchester and Hartford, Conn.

SALESROOMS: 477, 479 and 481 Broome Street, NEW YORK.
79 Chauncy Street, BOSTON.
186 Franklin Street, CHICAGO.

WILLIAM RYLE & CO.,

DEALERS IN

Domestic Thrown Silk of every description. Fine Pure Dye Silks for the woolen trade a specialty. Foreign and domestic

SPUN SILK YARNS AND NOILS

Importers of European and Asiatic Raw Silk.

54 Howard St., cor. Mercer St., - NEW YORK.

YARNS

SOLIS - - BOSTON.

179 Devonshire Street.

ANDREW J. SOLIS, Jr. & CO.

C. J. LITTLEWOOD & SONS, Ltd.

ALBION

DYE and BLEACH WORKS,

MANAYUNK, PA.

DYERS of Cotton, Cotton Yarns, Wool and Raw Stock Generally. **BLEACHERS** of Cotton and Cotton Yarn.

CITY OFFICE: 132 Chestnut Street. Telephone Connection,
PHILADELPHIA. MAIN OFFICE AT THE WORKS.

PROVIDENCE DYE WORKS.

Dyers and Finishers,

COTTON YARNS, Suited for HOSIERY and WEAVING Cotton, Woolen and Worsted DRESS GOODS, Woolen and Worsted Mixed CASSIMERES and CLOAKINGS, also Woolen and Worsted Slubbing, COTTON YARN and WARP DYERS and BLEACHERS.

FIRTH & FOSTER CO.,

OFFICES: **Philadelphia, 540 Bourse Building.**
New York Office, Silk Exchange, Broadway and Broome St.
WORKS: **Taylor, Emerald and Adams St., Kensington, Philadelphia, Pa.**

Boston Finishing Works

WILLIAMSTOWN, MASS.

BLEACHERS, DYERS AND FINISHERS

Of Pure Finish Shirtings, Sheetings, Canton Flannels and Filled Good ; Also Silesias, Satteens, Corset Jeans, Cambrics, Sleeve Linings, Pocketings, Flanneletts, and all descriptions of Dyed Goods.

NAPPING A SPECIALTY.

Being equipped with the French and other Foreign and Domestic Napping Machines we are prepared to give any kind of Nap required, including the French FlannelFinish.

R. GREENWOOD & BAULT,

GLOBE DYE AND BLEACH WORKS,

FRANKFORD, - PHILADELPHIA.

Specialists in Cotton Warps and Skein Dyeing.

HOME BLEACH AND DYE WORKS,

PETER B. McMANUS, Proprietor.

Dyers and Bleachers of Cotton Yarns,

PAWTUCKET, R. I.

Pawtucket Dyeing & Bleaching Co.,

BLEACHERS AND DYERS OF

COTTON YARNS AND STOCKINET.

OFFICE WITH **BLODGETT & ORSWELL CO., Manufacturers of Glazed Yarns,**
28 BAYLEY ST., PAWTUCKET, R. I.

COCHRANE CHEMICAL CO.,

50 Kilby St., Boston, Mass.,

MANUFACTURERS OF

ACIDS, AMMONIAS, ALUMS, SODAS

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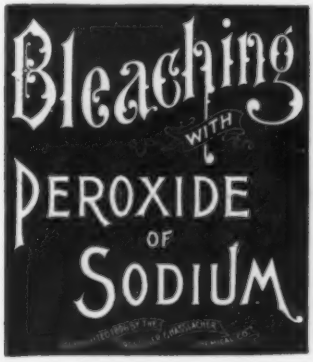

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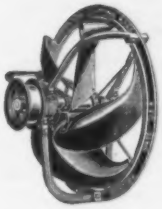

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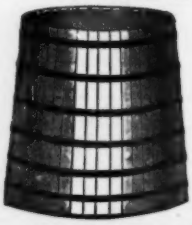
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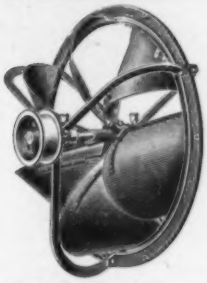

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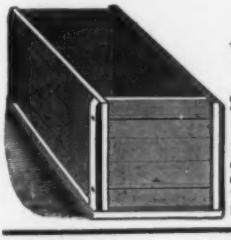

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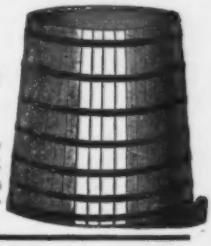

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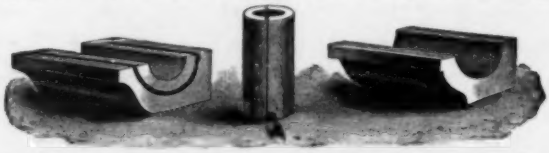

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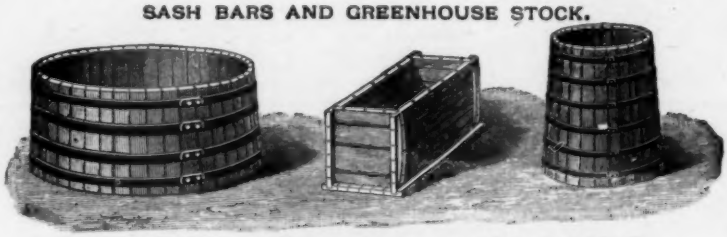

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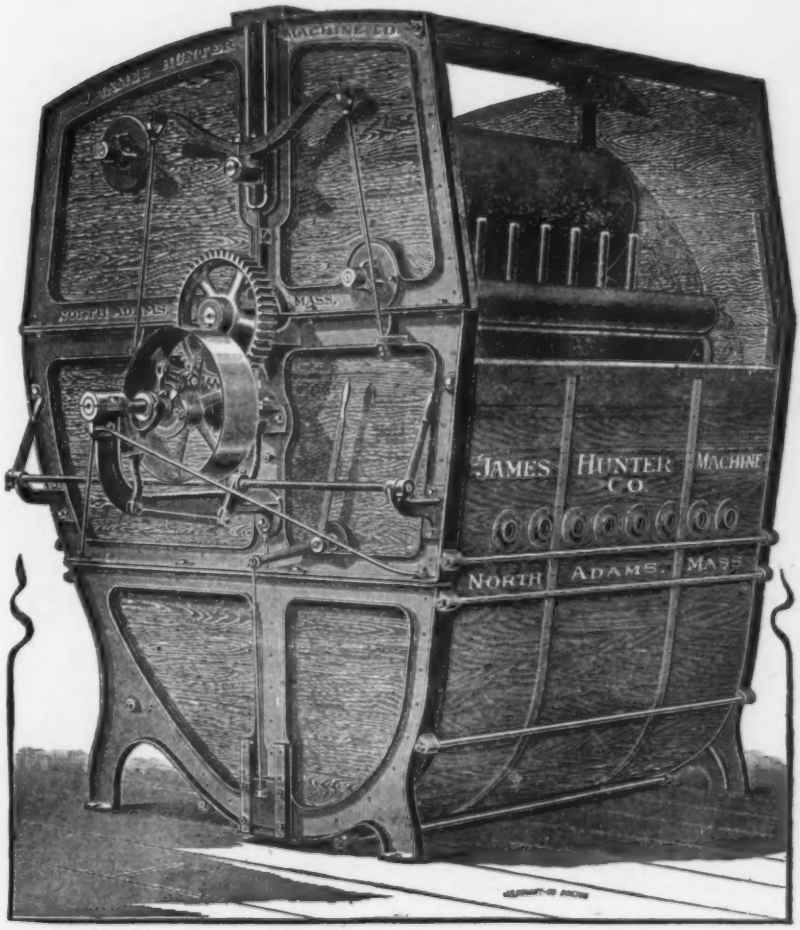

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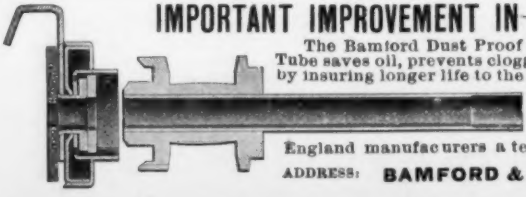

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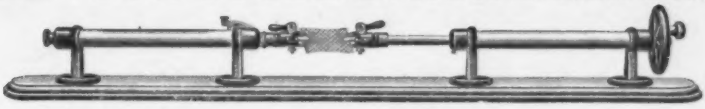

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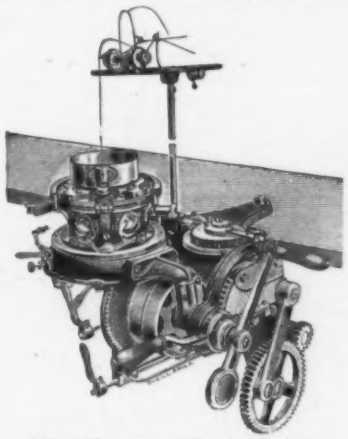

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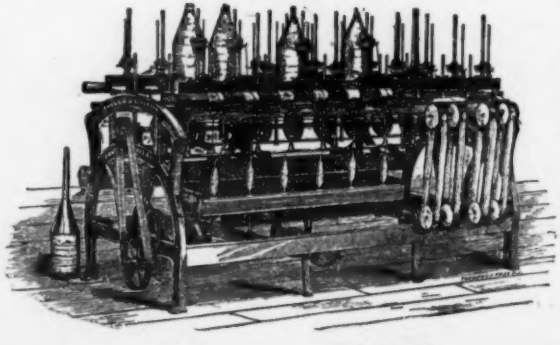

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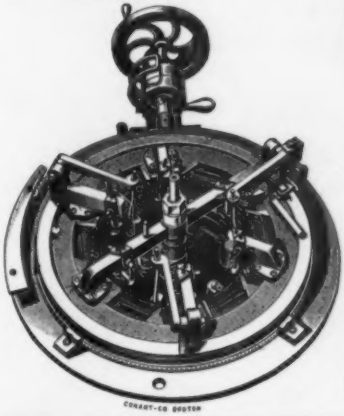

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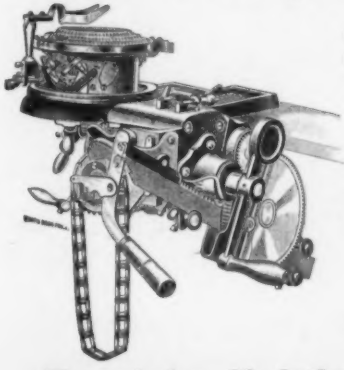

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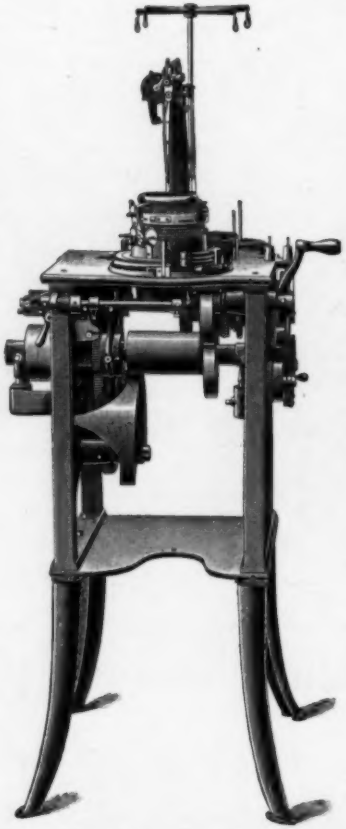

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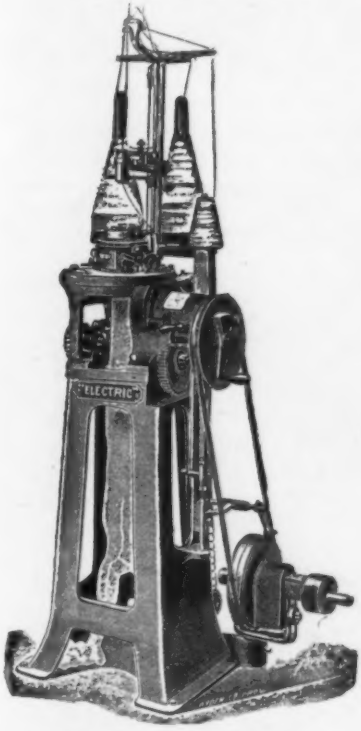

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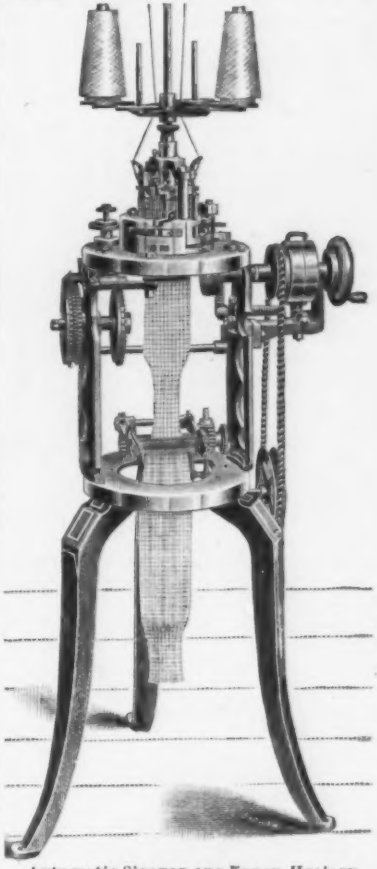

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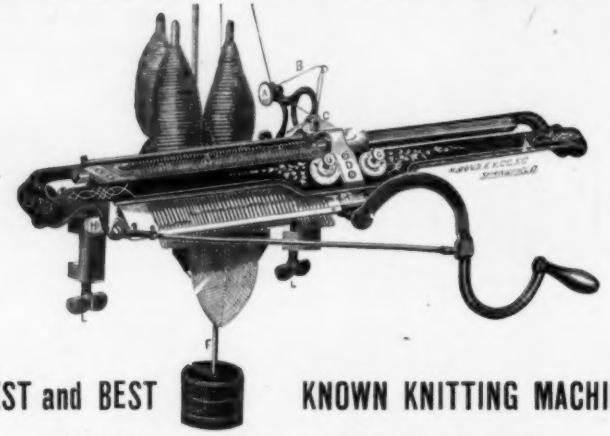

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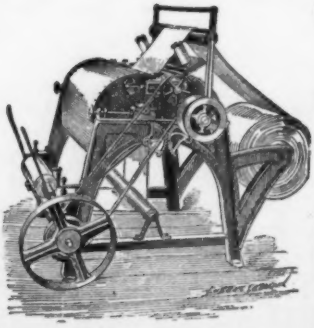

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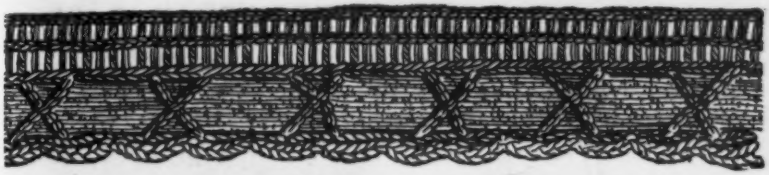

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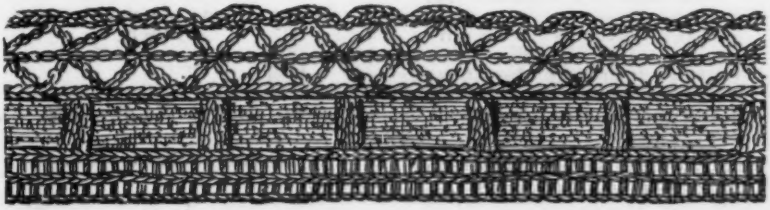

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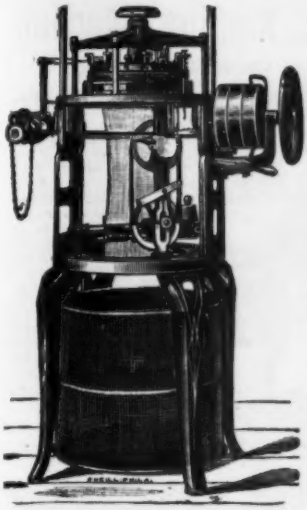

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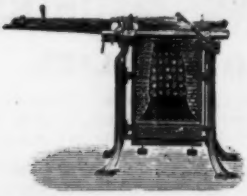

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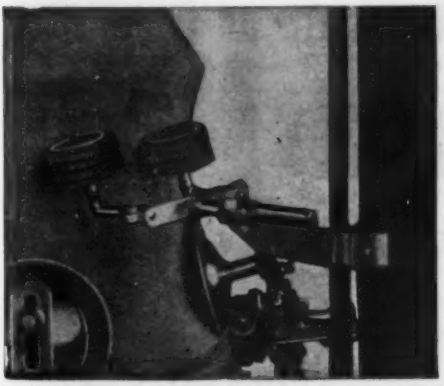

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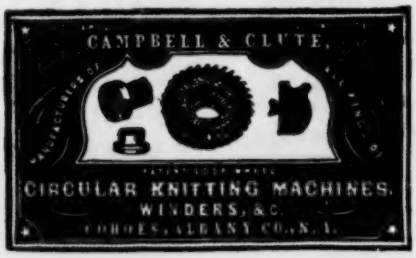

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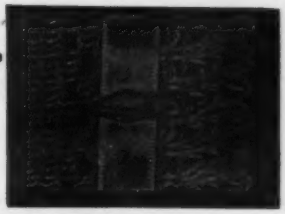

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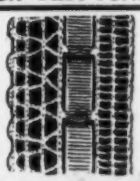

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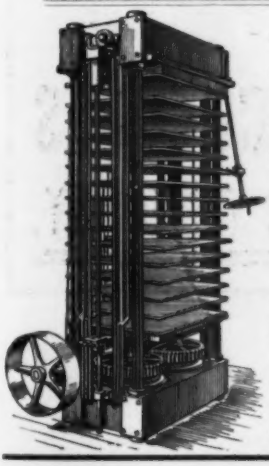

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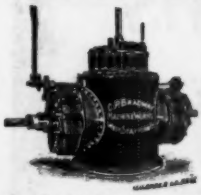

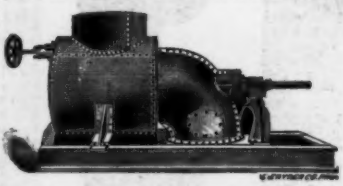

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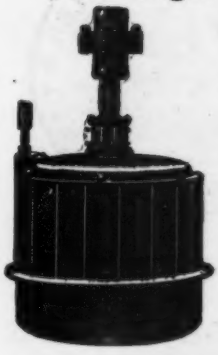

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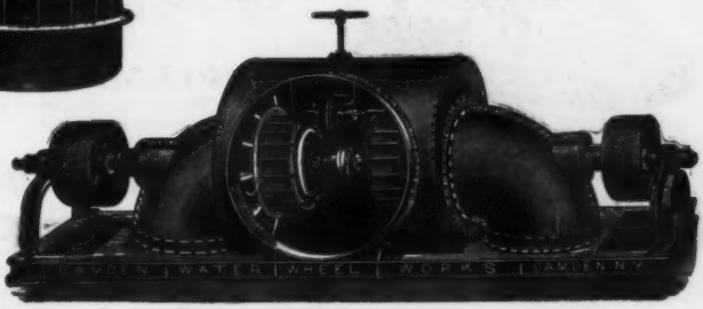

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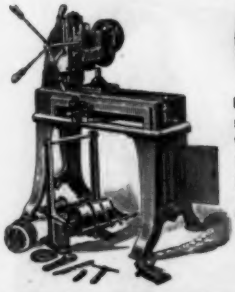

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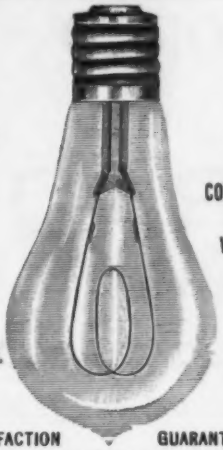

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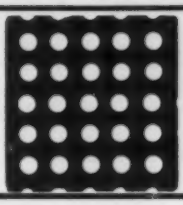

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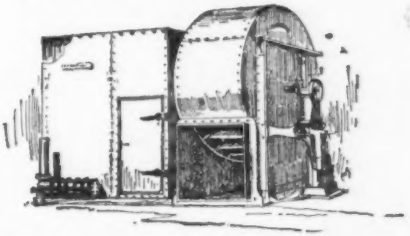

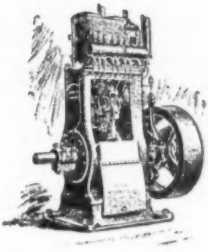

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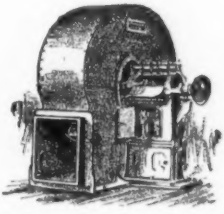

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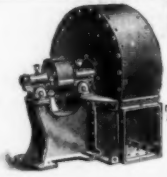
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